

**UNIVERSITY
of GUELPH**



**Ontario Ministry of Agriculture,
Food and Rural Affairs**

SCIENCE, TECHNOLOGY AND PEOPLE

ANNUAL REPORT FOR FISCAL YEAR 2004/2005

OMAFRA-FUNDED RESEARCH, EDUCATION AND LABORATORY SERVICES PROGRAMS

Integrated Research, Education and Laboratories Programs
Serving Ontario's Agriculture and Food Industries

October 14, 2005

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EXECUTIVE SUMMARY

Background

This Annual Report is being submitted to the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) in accordance with the terms and commitments under the OMAFRA / University of Guelph Agreement. This is the third Annual Report under the current 5-year agreement between the University of Guelph (U of G) and OMAFRA, which was signed March 20, 2002.

The period covered by this Annual Report is the University's 2004/2005 fiscal year (May 1, 2004 through April 30, 2005). The report covers the activities, budgets, expenditures and performance measures for each of the four program areas encompassed by the Agreement – **Research, Diploma Education, Veterinary Clinical Education** and **Laboratory Services**.

Summary of Activities and Results

All Performance Measures Agreements (PMAs) of the OMAFRA/U of G Agreement are reported on in much greater detail later in this report. The PMAs were unchanged from the previous year.

Within the research area, the **Food Research Program** and the **Resources Management and Environment (RME) Research Program** had several new projects implemented under the integrated issue-based or 'value chain' project structure, subsequent to the new two-stage LOI/full proposal competition. Some highlights from these integrated projects are provided in the Research Program Overview section of this report.

There were 297 active research projects in 2004/05. This is down slightly from the 319 projects in the 2003/04 fiscal year, primarily because each project under the new integrated proposal structure encompasses a number of research areas that formerly would have each been addressed through individual projects. Highlights of research accomplishments are provided for each of the research program areas – **Animals** (including Aquaculture, Beef, Dairy, Equine, Pork, Poultry, and Sheep), **Plants** (Field Crops, Horticultural Crops, and Pest Management), **Resources Management and Environment, Food, and Sustainable Rural Communities**.

Research funding received by the University of Guelph outside of but related to the OMAFRA Agreement increased to \$58.0 million in 2004/05, up 6% from the \$54.7 reported for 2003/04. Total research funding from all sources for all programs at the University increased from \$121.2 million last fiscal year to \$124 million in 2004/05.

The numbers of articles in the popular press and committee memberships in 2004/05 returned to the levels approximately equal to those in 2002/03, down from the spike noted in 2003/04. Many of the popular press articles are now written by SPARK writers. The numbers of presentations at scientific conferences decreased from the previous year but still exceeded the PMA target of 400. Presentations to industry and stakeholder groups increased from the previous year; for the third year (see table 1.3.1 for details). However, it should be noted that our reporting of these data is becoming more refined each year.

Royalty dollars increased substantially to over \$698,000 in 2004/05 up 68% from the previous year levels, primarily due to the increase of Soybean and Cereal royalties from the previous year. The University's share of total royalties decreased to 30.0% in 2004/05, as the largest increase in royalties was soybean cultivars with a higher portion of OMAFRA funding.

The delivery of Diploma Programs, 2004/05 has been a year of making further adjustments and fine-tuning of programs following the major changes that have occurred in the previous two fiscal years. Enrolments in Diploma Programs at regional campuses decreased in 2004/05, from 983 to 857 or 12.8% from the previous year. However, the Diploma Program enrolment was up by 1.8% when Guelph numbers are excluded, as the Agriculture and Horticulture Diplomas are no longer offered at Guelph. Student graduations, employment statistics and attrition data are detailed in the report (Tables 2.3.2 and 2.3.4). The first year of the new Turfgrass Diploma Program was offered at Guelph in 2004/05 and was very successful.

Total revenues from Continuing Education (CE) Programs at the regional campuses continue to grow, exceeding \$5 million in 2004/2004.

The Veterinary Clinical Education Program (VCEP) continued to provide support for the Veterinary Teaching Hospital, advanced clinical training, an externship and a 1-year post-graduate Veterinary Internship Program. As well, 23 of the 39 students enrolled in the graduate D.V.Sc. Program were supported by the VCEP Program.

The Laboratory Services Division (LS) continued to provide high-quality testing and diagnostic services to public and private clients in the agriculture, food and veterinary industries. The Animal Health Laboratory (AHL) performed about 586,000 procedures in support of disease surveillance. The Analytical Laboratory performed approximately 970,000 procedures for plants, soil, water and food. As a result of developing new programs in 2003/04 to expand on the number of test methods accredited to ISO 17025 standards, 46 new tests were accredited in 2004/05. LS is the first non-government laboratory to become accredited for method development and non routine testing. In addition, LS became licensed for water testing. Total revenue from outside the agreement decreased to \$9.1 million but still exceeded budget by \$0.3 million.

The SPARK (Students Promoting Awareness of Research Knowledge) program was again a prolific source of 73 articles for a variety of publications, providing profile for U of G research projects in 2004/05. These articles appeared in a number of media, including a variety of commodity organization publications, agri-food sector print publications, syndicated columns, periodicals, and the University's **Research** magazine. Through the agreement with OMAFRA's Town & Country Ontario television, the SPARK students continue to contribute InfoBreaks to that program as well.

1. Research Program

1.1 Accomplishments in 2004/2005

Management Accomplishments

- During fiscal 2003/04, the **Food Research Program** underwent its 4-year review by OMAFRA and the Agricultural Research Institute of Ontario (ARIO). Performance and accomplishments of the four-year program now completed were presented to ARIO and OMAFRA in a comprehensive report. As well, the priorities and initiatives for the Food Research Program for the next 4-years were developed, with implementation of new proposed research occurring as of May 1, 2004. A major restructuring of the Food Program was undertaken in this process, which will be discussed more fully below.
- As reported in last year's Annual Report, the **Resources Management and Environment (RME) Research Program** had undergone its four-year review in the previous fiscal year. However, due to the implementation of the Nutrient Management legislation and regulations, a significant portion of the Environment Research Program funding had been invested in short, 1-year term projects, to facilitate reinvestment of these monies in spring 2004 to address sectoral priorities pertaining to nutrient management issues. This allowed the University an opportunity to implement a restructuring of the Environment portion of the RME Program, similar to that undertaken within the Food Research Program.
- The restructuring of these two Research Program areas focused on three primary target outcomes, to improve the overall effectiveness and productivity of the OMAFRA program, as follows:
 - i. Implement larger and broader, integrated research 'programs' involving multi-disciplinary, and inter-institutional teams of researchers to address 'value-chain' outcomes (Food Program) or broad sectoral issues (Environment Program) in a more holistic and inclusive manner than has been attempted in the past with the funding of many individual, narrowly-focused projects. Through this approach, it is expected that Guelph's long-standing strengths in basic agri-food sciences and applied research capacity will be utilized as the foundation for building teams that cover the breadth from primary production through to specific outcomes of benefit to end users of the research (whether these be primary producers, consumers, agri-business, food/industrial product manufacturers, governments, or others).
 - ii. Expand opportunities for leverage of the OMAFRA Research Program funding by facilitating enhanced research partnerships across disciplines, across departments within the University, and between research programs at the university and other research institutions where complementary expertise can be harnessed to optimize the effectiveness of the OMAFRA Research Program output. In many cases, such collaborations have existed in the past, but the reporting and accountability structure of the OMAFRA/U of G Research Program precluded effective reporting of these leveraged resources. In addition to improving this reporting functionality, however, the new system is expected to move research collaborations and leverage opportunities to a new plane by encouraging linkages into new areas of research endeavour that complement and build on Guelph's foundational agri-food research strengths.

- iii. Pilot a two-phase application/approval process in which researcher teams submit a Letter of Intent (LOI) describing proposed research (Phase 1), with fully detailed research proposals (Phase II) requested from those LOI judged as best able to address the priorities and criteria of the research programs. The rigorous two-stage selection process ensures the research approved for OMAFRA program funding targets program priorities and sectoral needs, demonstrates partnership support, meets high science standards (assessed through external science review of proposals), has a sound research team management structure, and is cost-effective with a high probability of success. This process is intended to facilitate the building and management of the broader, integrated research teams and the leverage opportunities noted above while, at the same time, improving the researcher's return on time and effort invested in soliciting funding.

A key driver underpinning this restructuring was the commitment by the President of the U of G to 'convert' a million dollars of faculty and infrastructure support from the OMAFRA Agreement to other sources within the University budget, thereby allowing this million of OMAFRA funding to be invested in research program operating cash awards within the Food and Environment Research Program areas.

Experience gained through the implementation of this pilot with the Food and Environment Programs is expected to be invaluable as we anticipate moving forward with similar change to the rest of the research program areas in future years.

- Following the strategic analysis and planning exercise undertaken in 2002/03 that resulted in major changes in the overall program to meet inflationary pressures in the budget, some transitional issues persisted into 2003/04. For example, despite an agreed on 'Exit Plan' to reduce the infrastructure costs borne by OMAFRA (above and beyond the \$50.5 million contract) pertaining to underutilized research facilities, nevertheless, ongoing requests have been forthcoming from researchers seeking use of vacated or mothballed, but structurally sound facilities. OMAFRA's consideration and approval of the majority of these requests, despite the added pressure to the Ministry's budget, has been very much appreciated. The exploration of alternative facility management options undertaken by the Ministry in recent months is also much appreciated.

Highlights of Research Accomplishments

Several highlights of the past year's research are listed below under each of the research program areas.

Animal Research Program

Aquaculture Sub-program:

- Significant strides were made in improving nutrient and energy modeling in fish, which led to the development of better diet formulations that have significantly reduced fecal and soluble waste outputs. This has led to the lowering of environmental water quality impacts from commercial farms, especially cage-aquaculture facilities which utilize open-lake, public waterways, and which have been the subject of considerable controversy in the last few years. Improved monitoring approaches have also helped to predict, and mitigate eutrophication changes in lakes.

- The program expanded its work in fish behaviour and welfare indices, and published 2 significant research manuscripts that were widely cited and have created considerable discussion in the research and industrial sectors. This work is leading to an enhanced understanding of farm-fish welfare.
- The aquaculture program completed several 'industry funded' research projects in 2004/05, primarily for domestic as well as foreign feed manufacturers. These companies regard our in-house research capacity, which include our state-of-the-art Alma Aquaculture Research Station, as a unique resource that has helped them rapidly accelerate the selection and commercialization of new feed ingredients that have improved growth, lowered waste outputs, and helped keep feed costs reasonable. These companies would freely provide testimonial to the quality of our research deliverables, and the importance of our program, and facilities, to their success.
- Improved wastewater treatment technologies through engineering research on hybrid membrane filters, which will have application especially to recirculation systems.
- Finally, we are particularly proud of our recent success in bridging the science-policy interface with provincial and federal regulatory agencies. Through the efforts of 2 faculty members in particular, we have begun to develop an enhanced decision tool being considered by regulatory authorities. This tool is bringing the latest scientific and quantitative environmental assessment approaches to the table to aid in the development of improved regulation and policy which governs aquaculture in Ontario. This is a major leap forward for the application of science information.

Beef Sub-program:

- A simulation model of Ecoli O157:H7 infection in beef cow-calf herds was developed and validated against field study data. The model is useful for assessing the utility of various farm management strategies for reduction of this important human pathogen in cattle herds
- SNPs (single nucleotide polymorphisms) on the bovine genome were identified as having an effect on retail yield and product quality.
- Rankings of sires were found to depend on retail product specification and pricing in integrated value chain systems.
- Relationships of cow-calf efficiency and carcass traits were found to be of a magnitude that allows for simultaneous genetic improvement of both aspects of beef production.
- Reseeding an intensively managed rotational pasture to an alfalfa-based mixture increased sward yield by an average of 17% over 5 years, and produced 29% more calf gain per hectare per year than the 20 year old control sward (665 vs. 517 kg/ha). When stocked at a rate of 2.5 to 3.1 cow/calf pairs per hectare (1 to 1.3 pairs/ac), springborn calves averaged 287 kg (634 lb) by the end of the mean 164 day grazing season, and gains were unaffected by sward species composition. For a zero-till reseeding costing \$250/ha (\$100/ac), the extra 148 kg/ha (133 lb/ac) in calf gain would repay direct reseeding costs in from 1.5 to 3 years, for calf margins ranging from \$0.05 to \$0.25 per pound respectively.
- A novel mechanism of susceptibility to bacterial pneumonia was identified; namely, that corticosteroids (a model of stress) and bovine viral diarrhea virus infection (both of which are

important predisposing causes of shipping fever pneumonia in feedlot cattle) both impair the ability of airway epithelial cells to secrete proteins (defensins) that defend the lung against bacterial infection.

- Identified several novel proteins in lung wash fluids and in plasma that are altered during stress responses and/or during treatment with corticosteroids, that may help to explain why stressed calves (on arrival in feedlots) have an increased susceptibility to develop bacterial pneumonia, and might be useful biomarkers of disease susceptibility.
- A study showed that corn or soybean hull incorporation into haylage-based back grounding diets improves growth rate and feed efficiency.

Dairy Sub-program:

- A set of candidate genes associated with chronic *Staphylococcus aureus* infection of dairy cattle were identified using a bovine immune-endocrine microarray.
- Cows with high and low immune response phenotypes were identified in research and commercial herds, and the underlying genes associated with these phenotypes are under investigation.
- A study was conducted to test the ‘Herd Level Risk Factors’ for non-infectious and infectious causes of lameness for Ontario Dairy Herds. Lameness is one of the most important issues facing the dairy industry in terms of both production costs and public perception of dairy cow welfare. To assist dairy practitioners in making recommendations that reduce or prevent lameness, there is a need for knowledge about the prevalence of lameness and a more complete understanding of the factors that contribute to lameness in different North American management systems. Complete data was collected on 24 free stall herds and 89 tie stall herds. For both infectious and non-infectious lesions, cows housed in free stalls had a significantly increased prevalence compared to herds using tie stalls. For tie stall herds, the use of wood shavings for bedding and routinely spraying cows feet were associated with an increased prevalence of infectious lesions. However, the use of a total mixed ration was associated with decreased infectious lesion prevalence. For non-infectious lameness lesions in tie stall herds, trimming heifers prior to calving decreased prevalence by 4.6%, but there was a tendency for a higher prevalence in larger herds. In free stall herds, using less than 2.5 cm of bedding was associated with a 13.3% increase in non-infectious lesion prevalence. From these results, it is clear that the dairy industry continues to struggle with both infectious and non-infectious lameness lesions. The results also identified certain risk factors that were associated with prevalence levels. These risk factors should be managed accordingly to reduce the overall prevalence of lameness lesions.
- Studies were conducted to determine the prevalence of anestrus in Ontario Dairy herds; to evaluate herd and cow level risk factors for anestrus; and; in a separate study, to investigate the impact of a progesterone releasing intravaginal device (PRID) supplementation on days to first service, first service conception risk and days from calving to conception in at risk animals. The prevalence of anestrus varies considerably among dairy herds and had a negative effect on the probability of pregnancy at first insemination. Furthermore; among animals that had not displayed estrus before enrollment, PRID treatment shortened time to pregnancy beyond the improvement in time to first insemination.

- Alfred Organic Dairy Research Centre
 - The Centre was officially launched at its inaugural conference in April 2005.
 - Work toward a transition to certified organic status was begun and the certifying body (OCPP/Pro-cert Canada) visited the dairy station in the Spring 2005.
 - Supporting funding was received from OMAFRA (\$40,000 from Minor Capital) and Prescott-Russell Community Futures Development Centre (\$97,000 including \$72,000 from FEDNOR).

Equine Sub-program:

- Most horses in Ontario that are dewormed are thought to receive drugs that have no activity against tapeworms and infestation with the latter parasites is believed to play a role in horses developing colic. Data obtained from 235 horses across southern Ontario indicates that only 6.4% of horses had tapeworm eggs in their feces. Treatment for tapeworm did not significantly reduce the risk of colic suggesting that routine treatment of horses for tapeworms is not justified.
- Arthritis is a common disease affecting athletic horses (racing, eventing or pleasure). Many horse owners and trainers are employing alternative therapies, most commonly in the form of nutritional supplements. As a result, it is suspected that many equine nutraceutical products, including oral joint supplements (OJS) may not contain the type or amount of ingredients listed on the label. Study results indicate that most equine oral joint supplement products contained levels equal to or exceeding the label claims. However, several products contained little glucosamine, perhaps reflective of the unregulated nature of the nutraceutical industry.
- Erythropoietin commonly known as EPO is a hormone which enhances red blood cell production and has been used by athletes such as runners, cyclists to improve their aerobic performance. In recent years, EPO has also been used in horses to augment their racing performance. However, repeat administration of EPO in some horses induces immune interference with endogenous (natural) EPO resulting in fatal anemia. Until now; unlike the human response where administration of EPO triggers the release from the bone marrow of large number of precursor red blood cells, horses' precursor red blood cells have never been recognized. In a recent study it was demonstrated that in anemic horses (low in red blood cell counts) treated with EPO, precursor red blood cells called reticulocytes were released in large numbers into the circulation but this occurred only after a dose significantly higher than the one used in humans.
- Infected joints causing arthritis is a common problem in horses as a result of trauma, surgery or intra-articular injection. Without prompt and aggressive treatment, irreversible career-ending joint tissue damage can occur. A study showed that **biodegradable antibiotic impregnated implant** into the joint for sustained antibiotic delivery provided an aggressive, yet time efficient and low risk, treatment for septic arthritis in horses and the level of antibiotic was comparable to any traditional treatment when antibiotics are given orally or intra-venously/intra-muscular.

Pork Sub-program:

- Researchers and graduate students measured the amount of methane coming off manure storages at three southwestern Ontario farms between 2000 and 2002. The measured values are about half to three quarters lower than the default value set by an international panel

under the Kyoto accord, which is 10 kilograms of methane per pig per year. They are now exploring why these emissions are lower than expected.

- Research conducted has shown that there is a direct response between stress response of pigs just prior to slaughter and aspects of meat quality. Therefore reducing stress susceptibility of pigs – by increasing human pig interactions on the farm and before pigs are moved to the slaughterhouse - will benefit meat quality as well as animal welfare. Gene expression studies are now conducted to identify pigs that are more likely to be stress susceptible or that have reduced pork meat quality.
- Researchers are taking a molecular approach towards understanding the impact of pathogenic bacteria on pigs. They have shown that knocking out specific genes of pathogenic E-coli strains can reduce their negative effects on pigs.
- A team of researchers is exploring intervention strategies to minimize the most important pathogens associated with pigs. The group has already shown that fermented liquid feeding of pigs reduces Salmonella as compared to dry feeding.
- A group of researchers are studying the various factors that influence male reproduction in pigs. In heat stress studies they observed that during a six-week period after the higher temperature treatment, semen quantity and quality was reduced in several boars. This has direct implications for overall reproductive efficiency on swine operations.

Poultry Sub-program:

- Four “heritage lines” of chickens, a generous donation from Dr. Shaver, are the recent addition to the Poultry Research Station, greatly enhancing the research capabilities at the University in helping to study the effect and influence of the genetic background on the immune response to infectious agents, disease pathogenesis, behaviour etc.
- A cDNA microarray of a chicken immune system was constructed for the assessment of gene regulation in health and disease. This system will facilitate the process of finding ways to improve genetic control of health in poultry.
- A proteomic approach has been taken to identify key antigens of *Clostridium perfringens* that are associated with immunity to necrotic enteritis in broiler chickens.
- A versatile fowl adenovirus serotype 9 (FAdV-9) vector was developed which can express foreign genes and in turn the expressed immunogenic protein can induce protective immunity in vaccinated chickens. A recombinant FAdV-9 virus expressing the haemagglutinin-neuraminidase gene of Newcastle disease virus (NDV) was constructed and shown that chickens immunized with this recombinant virus have antibodies against HN.

Sheep Sub-program:

- The sheep program saw several projects reach conclusion in 2004/05. One project which examined the effects of feeding a high level of selenium to breeding ewes, found that ewes and lambs nursing ewes on the high diet, had higher blood Se levels than those on the control diet. Higher blood Se levels of ewes at breeding were associated with a higher number of lambs born per ewe, and higher blood Se levels of lambs at weaning were associated with higher weaning weights. This indicated additional supplementation with Se to breeding ewes is beneficial to production.

- A project examining the efficacy of vaccinating pregnant ewes against *Mannheimia haemolytica* using a commercial vaccine showed that titres were passively transferred to the offspring via colostrum. This offers evidence that vaccinating pregnant ewes may impart protection to neonatal lambs.
- A project that examined the effects of feeding monensin on peri-partum ewe health did not demonstrate improved ewe and lamb health but did show that independent of diet, prepartum Non-esterified fatty acids (NEFA) is a strong predictor of litter size and total lamb birth weight and postpartum NEFA of weaning weights.
- Gastro-intestinal parasitism in sheep continues to be an important disease of pastured sheep. The first step to developing models for its control under Ontario conditions was a survey done of current control practices. The survey found that there is little standardization of programs in Ontario and that sheep are often treated multiple times per season with one anthelmintic, setting up conditions for the development of anthelmintic resistance.

Plant Research Program

- Three new improved soybean cultivars with high-yield potential, export-quality and with traits (Round-Up Ready, Yellow Hylum, Soybean Cyst Nematode Resistance) desired by producers in Ontario were released.
- High-isoflavone Soybean breeding lines developed from the high isoflavone parent RCAT Angora were evaluated at multiple locations and several high yielding/high isoflavone lines have been identified.
- Fall strip-tillage can significantly improve soil dry-down and hence planting timeliness in the Spring. The fall strip-till system consistently dried down more quickly than the no-till system and was often fit for planting at the same time as the moldboard plow system. In Ontario, where the window for optimal planting of corn is often estimated at 10 days or less, this increased rate of dry-down is very important.
- Low-oxygen controlled atmosphere storage and postharvest riboflavin (vitamin B₂) application could enhance the red color of strawberries destined for processing. Riboflavin applied exogenously to strawberry fruits after harvest increased the anthocyanin coloration of the fruits. This would allow processed strawberries to be supplemented with the vitamin and allow the colour to be enhanced. This technology could be applied to help yogurt manufacturers obtain better quality strawberries for their product.
- In peach orchards, hand-thinning the fruit in late June is a standard cultural practice necessary to enhance fruit size and quality at harvest and prevent the tree limbs from breaking from excessive fruit. Hand thinning remains the most effective method to regulate the crop load, but alternative methods are being developed in order to offset this time consuming and expensive practice. Research is investigating three approaches to reduce the requirement for hand thinning: flower inhibition, chemical thinning, and blossom thinning. Success has been achieved on Redhaven, Harrow Diamond, and Harrow Beauty using all three approaches.

- Organic amendments such as paper-mill biosolids and recycled wood chips can help replace the use of residual herbicides in orchards. Residual herbicides can affect tree health and establishment.
- Carbon sequestration potential in tree-based intercropping systems with fast-growing tree species at a tree density of 111 trees per ha is five times higher than that found in conventional agricultural fields in southern Ontario. NO₃-N leaching can be significantly reduced and rainwater retention can be significantly enhanced in tree-based intercropping systems, compared to conventional agricultural systems.
- A genetic trait has been identified that eliminates extended photoperiod damage in tomato and that has the potential to make supplemental lighting of greenhouse tomatoes more economically feasible. Greenhouse tomato cultivars were also identified that respond favorably to lower average temperatures.
- *Anthracnose* on strawberries is a highly destructive disease and, in recent years, it has become widespread across North America. Without resistant cultivars, *Anthracnose* significantly reduces marketable yields when conditions are favorable for its development. No Ontario cultivars are resistant and breeding for resistance is a long-term program. The first step in developing an *in-vitro* selection technique for strawberries was successful. Using these techniques *Anthracnose*-resistant lines of current Ontario cultivars could be available in a much shorter timeframe.
- A threshold value, based on emergence patterns and pheromone trap catches of the Swede midge for timing insecticide applications was effective in the control and management of populations in broccoli and cabbage. Registered insecticides have relatively short residual efficacy against Swede midge, but if applications are timed to correspond to appropriate population peaks, then adequate control can be achieved, particularly with Matador and Assail.
- Systemic insecticide seed treatments not only control economically important dry bean insect pests, they also dramatically increase the overall health of the crop. This has a direct impact on insect pest thresholds later in the growing season.
- Pesticide-Free production cropping system yields have averaged as well as the conventional system with which it has been compared and economic analyses show higher returns.
- Natural source insect resistance in canola, originating from a weedy related species (*Sinapis alba*), is a highly significant discovery. This resistance is environmentally friendly and could potentially save producers significant input costs. To date Root Maggot and Cabbage Seedpod Weevil have been only partially controlled by agrichemical applications. No other control strategies (other than chemical) have been proposed for these two pests to date. The Root Maggot resistance genes are now being shared with the Rutabaga industry to develop resistance for this crop.
- White stem rust (*Sclerotinia*) is a persistent and serious fungal pathogen on all major food crop species. To date chemical control is only partially adequate because once the disease is found in the crop; it is too late for fungicide application. A new method of generating a simple point mutation that induces endogenous resistance at the cellular level has produced excellent field results.

- *Sclerotinia* rot on carrots can be reduced by disease forecasting and starting control measures (fungicides or trimming of leaves) following canopy closure when soil moisture is high. A disease forecasting system has been developed and is being field tested.
- Multiple insect pest control is available for corn through the combination of transgenic Bt technology and a new class of insecticide chemistry. By combining clothianidin, a new chloronicotinyl insecticide, growers can protect against the seven main insect pests of corn found in Ontario.
- DONCAST, a forecast system for *Fusarium* disease, is gaining interest and acceptance worldwide. A site-specific calculator is available that puts much more decision power into the hands of producers for fungicide spray application and for grain marketing.
- Several microbial agents strongly suppressed *Pythium* species found in hydroponic crops in Ontario. When applied in the nutrient solution, these agents multiplied on roots of test plants (chrysanthemum and snapdragon), and protected them almost completely against *Pythium* root rot.
- Reduced tillage systems can be used to reduce soil erosion and increase profitability for carrot and onion production on muck soils.
- New herbicide registrations include Frontier for control of yellow nutsedge in onions, Dual Magnum for weed control in peppers and Callisto and Option for corn.
- A new 5+3 spray protocol was developed to minimize the effect of bacterial diseases in processing tomatoes in Ontario. Use of a minimum of five copper sprays in the greenhouse followed by a minimum of three early sprays of copper in the field proved beneficial in a spring where favorable weather conditions would have caused significant plant damage.
- Research on European corn borer (ECB) and corn flea beetle (CFB) controls and impacts on honey bees indicate that carbofuran, presently preferred by Sweet corn growers to control ECB, can be toxic to bees. Alternative control products – spinosad, lambda-cyhalothrin, seed treatments – imidacloprid and clothianidin, and Bt-sweet corn – were effective in controlling either ECB or CFB and caused no harm to adult honey bees.
- Novaluron will provide Ontario potato growers with excellent control of insecticide-susceptible and imidacloprid-resistant Colorado Potato Beetle (CPB) larvae.

Resources Management and Environment (RM&E) Research Program

- Progress during the first year of the six large multidisciplinary projects approved in 2004 was reviewed by the program advisory committee in February, 2005. These large multidisciplinary projects represent, along with projects approved at the same time in the Food Program, the early implementation of the new value chain approach to agricultural and environmental research in the OMAFRA/University of Guelph Agreement. Several smaller previously approved but ongoing projects on related themes were amalgamated with these six projects during the year. In addition to these six large projects, ten smaller projects on themes not covered in the six large projects were reviewed by the committee. Three final reports on completed projects were submitted as well.

- Progress reports on the six large projects covered the period from May 2004 to December, 2004. Highlights of research accomplishments during this period include;
 - A risk index for pathogens has been developed. This index uses a series of spreadsheets that use inputs data from each farm in a catchment area and calculates potential pathogen loadings for surface water.
 - Field experiments are underway testing the effects of buffer strips, manure application practices and grazing systems on pathogen transport to surface water.
 - Total nitrogen loss through ammonia was found to be a function of the amount of nitrogen applied in manure, the type of manure applied and the type of tillage occurring before application. Liquid manure application resulted in more ammonia loss than solid manure.
 - Variability in plant available nitrogen was observed to be more than corn yield responses to applied nitrogen.
 - Field studies in 2004 indicated that crop yields and quality for carrots, peppers, cucumbers and squash did not respond to nitrogen fertilizer application. Research on this topic is continuing.
 - Side delivery manure spreaders were found to give more uniform applications than conventional rear delivery spreaders.
 - Nitrogen application at planting was found to produce higher yield responses in wheat than application later in the season.
 - Preliminary results for composting animal manures indicate a significant reduction in greenhouse gas emissions after one month.
 - Research with farmers in Perth County has revealed different perceptions of production risks from weather compared to climate change.
 - Detailed digitized data on land use, farm economics, weather, elevation, soils and water flows and quantities needed for subsequent modeling of the Grand River watershed have been obtained.
 - Work is underway to determine the economic costs of best management practices on farms in Ontario.
 - Composting paunch manure with cattle manure was effective in reducing pathogens. Composting manure was also found to be effective in reducing odour.
 - A computer model was developed of aqueous speciation of silver.
 - Field studies were conducted in 2004 to examine the usefulness of the electrical capacitance method as a rapid and non-destructive field technique for estimating the fresh or dry root mass of field crops.
 - The use of no-till resulted in a 9% reduction in production costs in a soybean-wheat-corn production system compared to conventional tillage. Net returns per hectare were found to be 42% higher for the best management practice system compared to conventional tillage.
- Mediation committees were found to facilitate local agricultural disputes. Research has suggested guidelines for “best management practices” for the operation of these types of committees.
- The most commonly identified pharmaceuticals in sewage sludge in North America were identified.
- The response of soil microbial communities to selected pharmaceuticals commonly found in sewage sludge has been evaluated.
- Acute toxicity of pharmaceuticals to benthic invertebrates has been completed.
- An economic model of agricultural trade with vertically integrated markets was developed and applied to the Canadian dairy industry.

- A study of the effects of the Special Safeguard Mechanism requested by the less developed countries in the Doha Development Round of the WTO with respect to wheat trade showed that, under trade liberalization, less developed countries may indeed lose and developed countries would gain if this proposal is adopted.
- A survey of biotech firms found that medium sized firms had higher innovation performance than large firms. Collaboration, networks and alliances were all found to improve innovation performance.
- A comparison of the movements of share prices for biotech IPO's in Australia and Canada contradicted the currently negative perceptions of financial performance in the sector.
- Farm financial data showed that the financial position of swine farrow to finish operations in Ontario continued to suffer under low product prices in 2002 and 2003.
- Compared to the United States, Ontario fuel prices were higher, fertilizer prices were about the same and pesticide prices were lower in 2004.
- The impact of labour variability and turnover on Ontario swine farms was found to be a significant cost item.
- The prospects for carbon sequestration payments to be an important revenue source for Ontario farmers do not seem to be great under the current policy and carbon price environment. This makes adoption of best management practices that contribute to carbon sequestration less financially attractive.
- In collaboration with the Canadian Agricultural Research Council, a comparison and evaluation of research funding models has been completed.
- Taxpayer financed funding for agricultural research in Canada has been falling for several years. Agricultural economists have proposed several rationales in support of taxpayer financed agricultural research. A critical evaluation of those rationales has concluded that many of them are no longer relevant and a more persuasive case needs to be made to focus the case for taxpayer support.
- The potential economic impact of a bioterrorist attack (for example, a deliberate foot-and-mouth outbreak) on the Canadian agricultural economy was estimated to be \$2.7 billion.
- Country of Origin labeling in the United States would be expected to reduce industry receipts by 0.7 to 1.3 % in the Canadian cattle sector.
- Ontario aggregate farm income fell to \$138 million in 2004, the lowest level in 30 years. Since 1997, aggregate farm income in Ontario has averaged \$287 million per year. Government assistance has represented 112% of aggregate net farm income since 1991 and 173% since 1999.
- Low protein diets are practical and economic ways of reducing airborne emissions in post-weaned pigs.

Food Research Program

A new integrated food/nutrition program was initiated in 2004 with new projects encompassing collaboration between University of Guelph faculty, Health Canada, AAFC and other universities internationally. This is a new focus on "value-chain" and outcomes based programs. Three research priorities areas were set, 1) Food Nutrition and Health (Nutraceutical and functional foods), 2) Food Safety, Traceability and Assurance and 3) Food Quality, including value-added opportunities and waste management. Seven projects were approved in 2004 and this year is the first year of reporting. Overall, the milestones of all projects are slightly delayed because all projects have started in September 2004. The delayed progress will be captured in 2005/06.

In 2004/05, funding for Food Program projects increased substantially from the 2003/04 levels due to the initiation of the new integrated Food Program. Nine conventional food program

projects; which covered Food Quality & Safety, Value-added components in Ontario-grown food Products and innovative technologies to manufacture traditional and new food products, were completed by fiscal year end and two were continued in 2005/2006.

Food research was conducted mainly at the U of G's Guelph campus. The U of G's Laboratory Services and the Guelph Food Technology Centre provide increasing research services to industry. The new integrated food/nutrition program was conducted across campus including 6 Departments from the U of G, Health Canada, AAFC, 6 other Canadian universities and 4 international universities/Institutes (from USA, and UK).

Highlights from conventional Food Program

- Validation of HACCP in pork production and processing was conducted and found that generic E. coli represents a poor indicator when attempting to trace Salmonella and enteric contamination; for example in pig herds, differs significantly between slaughterhouses. The process of controlled interventions is more successful in managing enteric contamination.
- Food borne viruses continue to emerge as pathogens of economic and health importance. Hepatitis A may have inadvertently contaminated the produce section of a supermarket. Real-time RT-PCR detection was developed and will benefit Ontario agencies engaged in food safety monitoring, inspection and risk analysis to meet the regulatory challenges.
- Salmonellosis is a human health concern, and the prevention of Salmonella colonization in poultry is an important issue in Ontario's poultry industry. Feeding 5.0% of non-immunized egg yolk powder can prevent Salmonella enteritidis colonization in laying hens with no adverse effects. This was filed in PCT patent last year and is under process for technology transfer to a Canadian based meat company.
- Ice structuring proteins (ISP) isolated from winter wheat was proven to be functional in the food system, provided the recrystallization process was sufficiently slow to allow for adsorption to the ice crystal surface. These results will benefit the frozen food industry (i.e. ice cream) by improving shelf life and quality.
- Microfiltration of butter milk was successfully applied to fractionate milk fat globule membrane (MFGM) by adding citrate in buttermilk. MFGM fractions could be marketed as value-added ingredients as well as functional and nutritional ingredient.
- A new injection method to reduce or prevent streaking in needle-injected pork has been developed. This solved the quality control problem of streaking in pork meat making it more attractive to consumers in domestic and export markets.
- It was determined the difference in kinetic constants for enzymes of the anaerobic pathway between cold-tolerant and cold sensitive potatoes indicated that anaerobic respiration played a role in resistance to low temperature sweetening.
- The Ontario wine industry has grown to an internationally recognized producer of quality wines. A new enzymatic method for the detection of acetaldehyde has been developed. This method will be beneficial to the Ontario wine industry by monitoring and reducing acetaldehyde through wine lactic acid bacteria.

- A new ozonation model was developed which integrates contactor hydrodynamics, ozone mass transfer, and ozone decay and disinfection kinetics. The model adequately predicts the dissolved ozone concentration and disinfection efficient in different ozone contactor configurations in water treatment systems. Ozone can more effectively inactivate a variety of microorganisms.
- Low-oxygen controlled atmosphere storage and post-harvest riboflavin application could enhance the red color of strawberries. Low dosage fumigation with thymol and acetic acid vapors can reduce post-harvest brown rot on apricot and plums. Ontario's tender fruit industry now has an alternative way of controlling rot during storage without the use of synthetic fungicides.
- The delivery of functional ingredients through food products has a much higher value to consumers than delivery through a pill. An in-depth analysis of consumer attitudes towards functional foods in Canada was conducted using a blend of qualitative and quantitative methods.

Highlights from new Food Research Program

- Research is being conducted to address the breeding of soybeans with higher isoflavone content and the incorporation of those soybeans into products that consumers will be able to incorporate into their daily diet. The common directive of this research is to add value to the Ontario Agri-food sector through increasing the consumption of soy isoflavones using functional foods.
- Pigs are the most relevant large animal models for investigating how functional food ingredients can improve cardiovascular, gut, and immune functions and prevent and reduce chronic diseases in humans. Using annealing techniques, de-branching and appropriate organic acid treatments, conventional corn starch can be significantly modified and processed for producing resistant starch with a functionality of water-soluble fiber for improved cardiovascular, gut, and immune functions and for preventing and reducing chronic diseases in humans.
- Novel bio-active peptides derived and created from milk and egg have an impact of immune enhancement, including optimizing macrophage functions, boosting protection against intestinal infections, and offsetting oxidative damage.
- To achieve high concentration in foods; without adversely affecting texture, the structure/function relationships of various sources of soluble fibre are being studied. The interaction of these materials with other food components with the goal of modifying structure and/or interactions is also being examined. This work will have significance to food processors by giving them the necessary ingredients and information to allow them to produce high fibre products and also to consumers by improving health status.
- Genetically modified (GM) crops have become the most rapidly adopted technology in agriculture accounting for 80% of canola, 35% of corn and 30% of soybeans grown in Canada in 2002. One major concern with novel products is the introduction of novel allergens into the food chain. A new study is underway to evaluate proteome and transcriptome profiling technologies for rigorous assessment of potential allergenic effects of novel foods in animal models.

- The triad of obesity-type 2 diabetes-cardiovascular disease (CVD) is a serious and growing health issue in Ontario. The study of the impact of low carbohydrate (CHO) on human health is an on going issue. These CHOs will be beneficial in minimizing the increase in biomarkers of CVD risk during food digestion. Research will continue to identify ways of improving food processing to enhance these health benefits.
- It is generally agreed that trans fats should be minimized, or eliminated from our diet. Without using high-melting trans fats, saturated animal fats or tropical oils, it is not possible to create a fat crystal network, and it is thus not possible to provide structure to a fat. A new molecule with organogelling properties – ricinelaidic acid - has been identified. Canola oil can now gel at room temperature with only 1% of this material. Clinical trials on an optimum monoglyceride-oil-water mixture commenced in January of 2005.
- There is a large gap in the existing literature on consumer attitudes towards food technologies making it extremely difficult to assess the ways in which consumers are likely to respond to emerging product and process technologies. The key factors determining levels of concern about food technologies include perceived benefit to individuals as consumers, long-term adverse effects, the degree to which the technology is perceived to be necessary and whether scientists have an understanding of the impact of this technology. At the same time, however, attitudes towards particular technologies differ; in comparison, to results of studies in some other countries.

Initiatives that will further enhance the Food Program:

1. An undergraduate symposium on carbohydrates, hosted by Dept. of Human Biology and Nutritional Sciences, University of Guelph, on January 22, 2005, attracted between 100-150 people. Four of the nine speakers were OMAFRA/UofG program researchers.
2. In June 2005 Food@Guelph, OMAFRA and AAFC were involved in an Agri-Food Innovation Forum held in Toronto that focused on agriculture, food and human health. The conference had speakers from three areas: academia, the food industry and government agencies. Among these speakers, three gave presentations on the health benefits of breads which stemmed directly from the Food program.
3. Advanced Foods and Materials Network (AFMNet) and Network of Centres of Excellence (NCE); established last year, are continuing to address three strategic research themes: (1) Structure-Dynamics-Function of Foods and Bio-materials; (2) Functional Foods and Nutraceuticals; and (3) Genetic, Ethic, Economics, Environment, Law and Society. The first Annual Scientific Conference was held on May 9-10 in Toronto. This NCE project is closely linked to the New Integrated Food Research Program as many of the Food program researchers are working with AFMNet investigators.

Sustainable Rural Communities (SRC) Research Program

Innovations in rural Ontario are thriving. Research on this topic has proven to be more than justified as a wide variety of innovations have been identified that affect the economy and labor market of local communities. This innovative project has attracted 25 times its own original research funding and continues to provide insights on how to provide a variety of on-line learning and capacity building modules on community engagement for innovation.

Land use has become a critical debate in rural Ontario and research on the Greenbelt, land trusts and farmland alienation have provided new insights and information for Ontario policy makers and researchers. A model of mediation for land use conflict has received national awards for its creative and practical powers in resolving difficult land-use issues in the province.

Other Research and Technology Transfer (from Alfred College)

2004/05 saw the deepening of Alfred's applied research in areas related to agriculture, food and rural affairs. These included, in addition to the major initiative to develop a certified organic agriculture research facility:

- Maple sap filtration research project (OMAFRA \$7,000; Ontario Maple Syrup Producers Association \$1,000; North American Maple Syrup Council \$7,000)
- Support of \$8,300 from Wildlife Habitat Canada to implement green practices at the farm
- A project to evaluate risks for septic tanks was developed in collaboration with the City of Ottawa and Canada Mortgage and Housing Corporation.
- Testing facilities for wastewater; various systems tested: Bio-B, Ecoflo, EPARCO, BioNest (Berger, Premier Tech, EPARCO, BioNest, Canada Mortgage and Housing Corporation)
- Feasibility study for an anaerobic digester (Ste-Anne-de-Prescott, Green Municipal Enabling Fund, Arborus Group)
- Recommendations for pathogen standards for fertilization of agricultural soils (Environment Canada and University of Ottawa)
- Impact of water softeners to septic systems (Canada Mortgage and Housing Corporation, Goulet Pompage, Ottawa University)
- Environmental impacts of anaerobic digesters (AAFC, ETAA, OMAFRA, DFC, Ottawa University, OMAFRA/University of Guelph)
- Literature review: recommendations and regulatory aspects for substrates used for anaerobic digestion and composting (OMAFRA, MOE).
- Pilot study on coagulation of veal, cow and pig manure (Livestock Environment Initiative)
- Alexandria pilot artificial wetland for municipal wastewaters (Township of North Glengarry, Jacques Whitford Environment, Green Municipal Enabling Fund)
- Laflèche pilot artificial wetland for landfill leachate (Laflèche Environnement Inc., Golder & Associates)
- Charlottenburgh Park wetland – Communal lagoon (Environment Canada, Raisin Conservation Authority)
- Alfred municipal wetland – Evaluation of a pilot system to treat municipal effluents (County of Alfred-Plantagenet, Green Municipal Enabling Fund, OMAFRA, Stantec Consultants Ltd.)
- Dignard artificial wetland – Evaluation of treatment for farm effluents (South Nation Conservation Authority, CanAdapt, Carleton University, Wildlife Canada)
- Evaluation of the production of fuel ethanol from whey permeate (OMAFRA, CRESTech, DFO)

Table 1.1.1: Research Projects Conducted in 2004/2005 and Approved for 2005/2006

	2004/2005		2005/2006		
Programs	# Projects Active ⁽¹⁾	# Projects Completed	# Proposals Received	# Proposals Approved	# Projects Active
Animals	181	60	74	71	188 ⁽²⁾
Plants ⁽³⁾	71	8	2	2	65
Resource Management and Environment ⁽³⁾	18	5	0	0	13
Food ⁽³⁾	17	9	0	0	8
Sustainable Rural Communities	10	7	6	4	7
Bioproducts	N/A		7	4	4
Total	297	89	89	81	285 ⁽²⁾

⁽¹⁾ 'Active' refers to all projects being funded in the specified year and includes new projects (started in that fiscal year) as well as continuing projects (initiated in previous fiscal years).

⁽²⁾ 4 approved research proposals were ultimately shelved by the researchers as the approved level of funding was inadequate to carry out the project.

⁽³⁾ No call for proposals was issued in the Plant, RME and Food programs; this contributed to the lower number of active projects for 2005/06.

1.2 Research Program Expenditures

Actual expenditures in the five commodity/discipline research program areas in 2004/05 are shown in Table 1.2.1, below. All research expenditures, including faculty FTEs and program overhead costs, paid from the OMAFRA program (OMAFRA transfer payment & program revenues) are included.

Total Research expenditures as presented decreased from \$35.2 million in 2003/04 to \$33.0 million in 2004/05. There are a number of program changes and reporting issues that contribute to this difference. One of these changes was the implementation of the ‘fully allocated’ reporting method for program costs (see Section 5.1, p. 73 for details). Some refined allocation decisions arising from this process resulted in shifts in support functions costs allocated to Research as compared to prior years, with two significant items being the allocation of Service Costs net of other costs and recoveries within the Agreement (-0.6M) and the reclassification of gross expenses of the Beef and Dairy Barns at Ridgetown (-0.2M) to Education (the barns operate on a cost recoverable budget). A second factor relates to the on-going reallocation of technical effort in OAC through the offering of an early retirement incentive and the expansion of cost recoveries, which resulted in a reduction in ‘OMAFRA’ position salary and benefits (-0.8M). Another contributing factor was the reorganization of Food and Environment programs, which included the redeployment of funds dedicated to Faculty support within the Agreement into direct project operating awards (\$1.0M in total) within the larger, integrated research proposals. Primarily due to the timing of the start up for these projects, a portion of these operating funds were unspent at the end of 2004/05 (-\$0.5M) and carried forward into the 2005/06 budget. It is expected that these funds will be expended in the 2005/06 fiscal year.

Table 1.2.1: Research Program Expenditures - Comparison of Direct Expenses 2004/05 and Previous Fiscal Year (in thousands of dollars)

	Alfred		Kemptonville		Ridgetown		Lab Services Div.		Guelph ⁽¹⁾		TOTAL	
	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual
Plants	-	-	537	499	1,226	1,212	-	-	6,622	6,011	8,385	7,722
Animals	-	-	382	363	144	119	-	-	5,196	5,014	5,722	5,496
Food	-	-	42	44	-	-	-	-	1,320	1,143	1,362	1,187
RME ⁽²⁾	-	-	181	184	394	585	-	-	2,101	1,929	2,676	2,698
SRC ⁽³⁾	-	-	-	-	32	14	-	-	291	258	323	272
Research Stations	-	-	982	1,005	480	493	-	-	7,874	7,857	9,336	9,355
I & S ⁽⁴⁾	245	183	520	393	444	338	15	-	6,214	5,402	7,438	6,316
Sub-Total	245	183	2,644	2,488	2,720	2,761	15	-	29,618	27,614	35,242	33,046

¹⁾ Guelph figures include Guelph, Simcoe, Vineland and Bradford

²⁾ Resources Management and Environment

³⁾ Sustainable Rural Communities

⁴⁾ Infrastructure and Support, includes Research Program I&S plus Institutional Service Costs. See ‘Financial Summary’ – Section 5, page 72 for further details of ‘Indirect Costs’

1.3 Research Program Performance Measures

Table 1.3.1: This Table lists the Performance Measures in the order shown in the Agreement and the results. The general areas addressed and the specific outcomes expected are described in the 'Objective' and 'Measure/Activity' columns (slightly abbreviated versions on the full wording in the Agreement).

Objective	Measure/Activity	Result
1, A,B,C Priorities	OMAFRA-identified Research Priorities are met.	Research Program priorities were met. New integrated issues-based or 'value chain' research proposals were implemented within the Food Program (7 projects) and Resources Management and Environment Program (6 projects) in May 2004 New, strategic directions for the Bioproducts Research Program areas were identified by OMAFRA, and proposals to address these solicited and approved for implementation in May 2005. The Animal program was granted an extension (with projects extended or new proposals approved for 1 or 2 year terms) to allow the bulk of the Animal program funding to be rolled into the New Sustainable Production Systems program concurrently with the Plant Program as of May 2006. Extensive communication with faculty was undertaken to explain the upcoming changes to these research programs.
2, A,B,C Reporting	Delivery on time and within budget A and B. 95% of projects completed on time and within budget. C. Meet 90% of milestones for projects in progress.	A and B. A total of 106 Final Reports for projects were submitted, of which 97% were on time. Arrangements have been made to bring all completed projects to a zero overspent balance (by transferring expenses to related trust fund research revenues) C. 90% of milestones for projects still in progress were met. In several projects the milestones had been established but due to delays in actual start date of the projects some of the milestones were not met but will be captured in 2005/2006.
3 Animal Care Standards	Meet or exceed Animals for Research Act and Canadian Council on Animal Care Standards	The new Beef Research Barn at Elora was completed in fall/winter of 2004/05 (replacing Beef Research Barn # 1 that had been condemned by the Canada Committee on Animal Care). The OMAFRA Minor Capital program provided approximately \$2.5 million in 2004/05. This funding was spread across all OMAFRA stations and regional campuses in support of 102 projects to address priority animal care, health and safety, code compliance and some critical equipment deficiencies. Of particular note, approx. \$127K was invested in renovations at the Elora Dairy Research Centre to address the most serious health and animal care deficiencies at that facility. It is hoped this will alleviate the major concerns of the CCAC, allowing time for the planning and construction of a new Dairy/environmental research centre over the next 2-3 years.

Objective	Measure/Activity	Result
4, A,B,C Funding from non-OMAFRA Sources	A. Annually increase funding from non-OMAFRA sources for research related to the OMAFRA Agreement.	Total Non-OMAFRA Funding for Research Portion of Non-OMAFRA Funding for Research Related to Agreement (\$million) 2004/2005 90.9 58.0 2003/2004: 86.0 54.7 2002/2003: 69.5 42.7 2001/2002: 69.2 38.5 2000/2001: 61.5 35.3 1999/2000: 52.0 36.8 1998/1999: 38.0 23.8 Details of the University's research funding are found at www.uoguelph/research/summaries. Non-OMAFRA funding for research related to the OMAFRA/U of G Agreement increased by 6%.
	B. Annually increase research funding from business and industry sources.	B: Business and industry support dropped by \$1.7 million from the previous fiscal year. The continuing fiscal constraints faced by several commodities and the gap between Canada-Ontario R&D Programs could be contributing factors. 2004/2005 \$14.4 million 2003/2004 16.1 2002/2003: 16.4 2001/2002: 16.4 2000/2001: 15.4 1999/2000: 12.2 1998/1999: 12.0
	C. Report non-OMAFRA funding for infrastructure	C: Awards were received in 2004/05 for \$3.68 million in non-OMAFRA funding for research infrastructure related to the OMAFRA Research Program objectives. These awards were combined CFI (Canadian Foundation for Innovation), OIT (Ontario Innovation Trust) awards and matching contributions. Refer to page 65 for details.
5 Intellectual Properties	Annually increase the number of licenses, patents and royalties.	In 2004/05, there were 82 germplasm disclosures (new cultivars, hybrids or non-seed propagules) comprised of 16 maize, 46 soybean and 20 alfalfa varieties. In 2003/04 there were 25 germplasm disclosures (17 barley, 1 oat, 3 wheat and 4 soybean cultivars). 7 of 24 non-germplasm disclosures made in 2005 were related to OMAFRA funding as opposed to 6 of 19 in 2004. As of year-end 2004/05, there were 46 OMAFRA-Program related patents held by the University, of which four were issued in 2004/05. Of the 46 OMAFRA-related patents, a total of 39 have been licensed. In the year ended March 31, 2005, there were 24 new exclusive and 1 new non-exclusive germplasm licenses signed. For the same period, there were 3 new non-germplasm licenses (2 exclusive; 1 non-exclusive) signed. Further details can be found in the Intellectual Properties section beginning on page 68.

Objective	Measure/Activity	Result
6 Royalties	Increased combined seed and technology royalties by an average of 5% per annum over the 5-year term of the Agreement.	Germplasm royalty income increased substantially by 68% in 2004/05 to \$698K (net). Royalties on horticultural cultivars represented 5.3% of gross royalties and field crops 94.7%. Soybeans made up 64.3% of the latter, with cereals a distant second at just over 16%. Royalties on non-germplasm technologies in 2004/05 amounted to over \$96,000 (net). Refer to page 69 for further details. The University's percentage share of germplasm royalties decreased to 30.0% in 2005 over 36.3% in 2004 as the largest increase in royalties was due to soybean cultivars with a higher portion of OMAFRA funding.
7, A,B Reporting	A. Submit 4-year program reports at appropriate time and submit changes to research programs by Feb. 15 of each year. B. Report to OMAFRA by Feb 15 on 95% of OMAFRA projects in their final year. C. Annual summary reports to be submitted to OMAFRA by Feb. 15 on each project completed or in progress, in a form which can be readily communicated to the public	A. The Animal Program, which was due for its 4-year report to ARIO in winter 2005, was granted an extension to allow funding from both the Animals and Plants Programs to be rolled over into the new Sustainable Production Systems Research Program as of May 2006. Plans for establishing the Bioproducts Research Program were completed, with solicitation, review and selection of proposals, culminating in the approval of 3 new integrated bioproducts research projects being approved for implementation in 2005/06. B: The target of reporting to OMAFRA by Feb. 15 on 95% of the OMAFRA projects in their final year was not met. By Feb. 15, only 90% of the expected final reports were received, a marginal improvement over the previous year. This performance measure, remains problematic, since most projects in their final year have an April 30th completion date, thus making 'completion' as of the mid-January reporting timeline an impossibility. 99% of expected annual reports for projects were received by Feb 15th. C: All annual and final project reports received in time were submitted to OMAFRA in time for preparation for the Research Review Committees' meetings, the majority of which occurred in February. Researchers are asked to provide, in a form free of non-disclosed information, a summary of results and progress against milestones, and in addition in the case of final reports, their conclusions and the significance of the research to the Ontario agri-food sector.
8 Scientific Productivity	Maintain or increase the annual number of: A: Peer-reviewed journal publications (Target: >300) B: Presentations at scientific conferences (Target: >400)	There were 352 peer-reviewed journal publications reported, compared to 340 in the previous year. In addition, there were 203 books or chapters in books published, compared to 78 in 2003/04. Values reported are for publications dated in the calendar year, so the 2004/05 report is for publications in 2004. The total number of presentations at scientific conferences reported was 562, compared to 723 in the previous year.

Objective	Measure/Activity	Result
9 Communication of results to stakeholder or industry audience	Maintain 2003/04 levels for the combined total number of: A. Presentations in the media B. On the internet C. At stakeholder or industry meetings	A: 192 articles in the popular press, compared to 304 a year ago. Many of the popular press articles are now written by SPARK writers after interviewing faculty, so the faculty are not the authors (see Media section). B: There were no new presentations on the internet. Almost all the faculty involved in the Agreement have their own web pages. The total is >300. C: There were 518 presentations to stakeholder or industry meetings, tours, etc. compared to 413 reported in 2003/04. Our reporting of these data is becoming more refined on a yearly basis.
10 Expert Contribution	Maintain the number of committee commitments year to year	There were 296 memberships on provincial, national and international committees reported for 2004/05, compared to 371 reported for the previous year. Our reporting of these data is becoming more refined on a yearly basis.
11 OASIS Database	Complete a thorough review of research database needs	During 2004/05, the UofG initiated a plan for a new, comprehensive database to support the OMAFRA Research program, which will ultimately allow the University to replace the OASIS database which is outdated and housed on unsupported software. The planned database will also support data collection and management for other research funding and program/animal care training and protocol tracking capabilities and will be constructed on a web-based interface which will streamline project entry, updating and reporting procedures by researchers. Initial development work on this database was undertaken in 2004/05, although progress has been slowed by the lack of dedicated resources for the task.
12 Impact	Identify a method of measuring impact and submit to the Executive Committee	This PMA was addressed in year one of the current 5-year agreement, through the provision of a 'research impact analysis' study that demonstrated the typical methodology of such studies (as reported on in the 2002/03 Annual report). OMAFRA has since expressed their interest in exploring a separate evaluation of the impact of the research undertaken through the OMAFRA / U of G Agreement. Some specific examples of research with significant impact are provided in the Highlights of Research Accomplishments in this Annual Report.

2. EDUCATION PROGRAM

2.1 Diploma Education

Guelph Campus, Alfred College, Kemptville College, and Ridgetown College

2.1.1 Introduction

The year 2004/05 saw steady, incremental growth in student numbers at Ridgetown and Kemptville and was most notable as the year of the first graduating classes from the new suite of diplomas: the Associate Diploma in Environmental Management at Ridgetown, in Food, Nutrition and Risk Management at Kemptville, and in Turf Management at Guelph.

The new diplomas are attracting highly-motivated students and in each case the enrolment target, set by resource constraints, was filled each year. It is notable that in the Environmental Management diploma demand is proving to be greater for the stream oriented to rural communities (called Municipal/Industrial) than for the agriculture stream.

Existing diplomas in agriculture and veterinary technology remain popular, and as with the new diplomas, students and employers report being very satisfied with their training. A very notable achievement this year was that the Associate Diploma in Veterinary Technology received accreditation from the American Veterinarian Medical Association (AVMA); it is the only accredited program in Canada. By contrast, demand for diploma training in horticulture remains weak, we believe because of the seasonal nature of employment in the industry. No entry into horticulture was taken at Kemptville this year (although stronger numbers justified our accepting an entry class in Fall 2005 for the academic year 2005/06). At Ridgetown in 2004/05 we worked with industry to identify their needs as a first step to designing more appropriate horticulture programs, most particularly targeted to greenhouse production.

Continuing education and business development continued to grow as the OMAFRA facilities at the regional campuses leveraged other funds to provide training relevant to agriculture, food and rural communities. Continuing education and business revenues in 2004/05 increased by 32% at Ridgetown; business development revenues also increased by 17% at Kemptville.

2.1.2 Guelph Campus

The Associate Diploma in Turfgrass Management program was initiated in 2003/04. The program became fully operational in 2004/05 with students in both the first and second years of the program. Of the thirty-one students who began the program, twenty-nine successfully completed their first year and moved in to the second year of the program in the Fall of 2004. Twenty-six of these students successfully completed the program requirements and graduated from the program at the June, 2005 Convocation ceremony. The graduates have all found employment and are working in Canada and the United States.

Thirty-four new students entered the first year of the program in the fall including an Australian who is our first international student. Of the students entering the program, only one was required to withdraw from the program due to academic performance standards at the end of the Fall, 2004 semester. Interest in the program continues to grow as the turfgrass industry and high school guidance counselors become aware of this new program.

2.1.3 Alfred College

Academic Programs 2004/2005

- A new intake of students was taken for the Agriculture diploma in Fall 2004. A group of students was enrolled in the new Food, Nutrition and Risk Management Diploma which was offered for the first time at Alfred.
- The last OAC Teacher Conference was held in Alfred in May 2004 with the participation of delegates from Ridgetown, Kemptville and OAC at Guelph.
- Collège d'Alfred has participated actively in the discussions of the Provincial Diploma Committee for the development of options in the Agriculture Diploma and the development of the learning objectives of all diploma programs offered at OAC.
- To reduce the cost of teaching per student, some of the existing courses in the Agriculture diploma have started to be offered in alternate years.
- Collège d'Alfred is participating with the University of Guelph in the development of a new campus at Orleans.

Continuing and Contract Education

- The college completed delivery of the Food Service Worker training program at the Hawkesbury and District General Hospital. (12 students, 180 hours).
- In collaboration with the Adult Education Centre in Hawkesbury and the Centre alphabétisation de Prescott the college delivered Food Service Worker training to students completing their high school diplomas. (Six students, 180 hours)

International Programs

- The college delivered programs in the following locations during fiscal 2004/05: Comoros Islands, Equatorial Guinea, Democratic Republic of Congo, Morocco, Tunisia, Chad and Mauritania.
- Programs were also under development for future projects in these and other countries including Chile and Guatemala.

Program Development

- Approval received from MTCU to deliver Parts person pre-apprenticeship program in partnership with Collège Boréal; proposal re-submitted with La Cité Collégiale as partner.
- Preliminary work with OMAFRA and CFIA on meat industry training program.
- Development work on a variety of potable water and wastewater initiatives in collaboration with Ontario Rural Wastewater Centre including (ORWC):
 - Circuit Rider Training Program (with Ontario First Nations);
 - Continuing Education training for City of Ottawa water and wastewater operators;
 - Capacity-building proposals for ORWC to Ministry of Municipal Affairs and Housing and Ministry of the Environment.

2.1.4 Kemptville College

Diploma Education Program

Enrolment:

There were a total of 212 students (78 males, 134 females) enrolled in the Diploma programs at Kemptville in the 2004/05 academic year. Enrolment in the Agriculture Diploma was 151 students, in the Food Nutrition and Risk Management Diploma was 45 and due to the fact that we did not take in a junior year the enrolment in the Horticulture Diploma was only 6 students. This was the first year to graduate students from the Food, Nutrition & Risk Management Diploma. The course content for the whole two years is now complete and new equipment has been purchased with the \$100,000 raised by the Kemptville Foundation.

There were 77 students registered in full-time one year certificate courses in 2004/05. The three certificates are Equine Management, Industrial Welding & Fabrication and Diesel Equipment Mechanic. These programs complement the OMAFRA based Diplomas by allowing students to move from one program to another and to have diploma students take courses (for credit or interest) like welding and small engines or riding. The certificates also supply students who live in residence and participate on Students' Council and clubs.

A survey of students found that 83% of students would recommend Kemptville College to friends, 12% were not sure and only 5% disagreed. The College's administration and staff are working with students to try and improve on these already good results; the exercise room has been moved and upgraded with 7 new machines, a course on AI will be offered in collaboration with EBI, a temporary second riding arena is being set up for the winter 2006 semester, suggestions from student course evaluation are being implemented to improve course content and delivery.

In the 2004/05 academic year several Horticulture Diploma courses combined with Level 1 & Level 2 Horticulture Apprenticeship courses and Horticultural Diploma students in courses like Business Management and Human Resource Management have been integrated into Agriculture Diploma splits. These changes have helped to minimize the cost per student in the Diploma and have provided the critical mass of students to run Diploma courses. As a result it has been decided to have an intake of junior students in the Horticulture program for fall 2005. It is expected that there will be 15 students in the junior class.

The Academic programs have had a very productive year in developing partnerships that will continue to benefit us with the promotion of our programs. A pilot program; REALS (Reconnecting and Engaging through Apprenticeships and Local Skills), has been developed in collaboration with the Upper Canada District School Board, The Catholic District School Board of Eastern Ontario and the Ontario Youth Apprenticeship Program coordinators for this region. The program is part of the initiative of the provincial government to keep youth in school until they are 18 years old. It has been promoted in all the high schools of each board and has increased the visibility of Kemptville College. We believe this will have a significant long term effect on increasing enrolment.

Kemptville College received funding through the Eastern Ontario Development Fund to hire a Recruitment Officer starting September 2005. A significant effort will be made this year to promote our programs directly to high school teachers in related areas of study and to guidance

councilors in Eastern Ontario schools.

The Dairy 2050 Proposed Plan now includes the building of the heifer raising facilities for the University of Guelph and a new free-stall dairy facility for teaching purposes at Kemptville. As part of the plan a study on the education and training needs of the dairy industry will be conducted. Kemptville College will modify its curriculum and program delivery methods to respond to the needs as determined by this study.

Business Development Training Group

Healthcare Food Service Certificate

This program was offered in 4 locations. Enrolment was up from 60 students to 90 students. The Ministry of Health requires increasingly that this program be taken by staff working in institutional cafeteria with a positive influence on enrolment.

Distance Education on behalf of the Canadian Healthcare Association (CHA)

KC manages the CHA Food Service and Nutrition Management (FSNM) 2 year distance learning program out of CHA headquarters in Ottawa. KC is an integral member of the CHA Learning management team. In 2005, 43 students from across Canada graduated in the FSNM program. Enrolment for the 2005/06 academic year is expected to be 100-110 students, with 60 students in year 2 and 40-50 students in the first year. In addition, KC manages the CHA 1 year distant learning certificate in nutrition and diet therapy.

Special Project: Visioning Future Models for Community Nutrition Programs

In June 2004, the Canadian Association for Community Care (CACC) in partnership with the Ontario Community Support Association (OCSA) received funding from the Ontario Trillium Foundation to develop a vision for **Meals on Wheels (MOW)** programs for the future. The project involved three sequential components: 1) Hosting an invitational roundtable, "Meals on Wheels – Best Practices for 2020 & Beyond". 2) Carrying out a survey of MOW programs in Canada to expand the work of the roundtable and explore barriers to achieving the 2020 vision. 3) Developing an electronic network to stimulate continued discussions nationally and share resources beyond the life of the project

Special Project: National Food Safety Awareness Program for Young Adults in Colleges and Universities

The Canadian Partnership for Consumer Food Safety Education has developed a national food safety campaign for young adults, specifically college and university students who are living independently – shopping and cooking for themselves. Kemptville College and the Partnership successfully implemented the campaign as a pilot project in February 2004 at six different campuses. With funding support from Agriculture Canada, Kemptville College is working with the Partnership to launch the campaign on 20-25 campuses across Canada in November 2005.

International Programs

The international activities of the BDTG have expanded in a number of areas in the past year. The highlight was an exchange of staff and faculty between the BDTG and Tamil Nadu Agricultural University. Kemptville College is positioning itself to deliver specific training programs to facilitate business between Canada and India.

Training Needs Assessment

Kemptville conducted a "Training Needs Assessment" for the Eastern Ontario Training Board. The primary objective of this research project was to assess the training needs in the agri-food, bio-resource and environment sectors for Franco-Ontarians in Eastern Ontario. The findings provided strategic information of value to both Collège d'Alfred and Kemptville College.

Technical Training

BDTG offers 10 technical courses such as forklift operation to many clients such as Kemptville Truck Centre (all locations), the St. Lawrence Seaway Commission, Pembroke Municipal Waste Systems, the City of Ottawa and the Transportation Health & Safety Association of Ontario. Five new courses will be offered under a joint Venture with the Greater Ottawa Truck Training in liaison with La Cité Collégiale.

The technical trades programs increased its number of students from 263 to 400.

BDTG successfully developed a partnership with the Municipal Health and Safety Association of Ontario. It now provides all chainsaw maintenance and safety training on its behalf. Since the realization of this partnership BDTG certified all the employees of the City of Ottawa, the Canadian Coast Guards as well as filling various training requirements for the City of Cornwall.

Oil Burner Technician Programs

BDTG has developed in collaboration with the Canadian Oil Heating Association (COHA) and Technical Safety Standards Association (TSSA) a new Oil Burner Technician 1 (OBT) program, geared to industrial and commercial oil heating. OBT programs at KC continue to be fully subscribed as over 3000 technicians will require training or re-training in the next 7 years.

The Dairy Herdsperson and Horticulture Technician Apprenticeship (HTA) Programs

In 2004; 12 students enrolled in the Dairy Herdsperson program. Kemptville College is the only institution offering this program in Ontario. A one year livestock management certificate is under consideration. The Horticulture Technician Apprenticeship program had 15 basic students and 17 advanced in 2004/05. The HTA will have 2 intakes in 2005/06.

Equine Programs

In 2004/05 BDTG ran a number of Equine related courses and events. Hoofcare for the Horse Owner, always a popular course, had 3 intakes with a total of 30 people completing the course. A full time Farrier course is an area of growth for BDTG that will be explored in the future. The 3rd Annual Kemptville Slide Reining show was a huge success with over 100 horses and competitors participating, from Quebec, Southern Ontario and the USA.

2.1.5 Ridgetown College

Diploma Education Programs

Once again enrolment in the Diploma Programs at Ridgetown campus increased in 2004/05 up 12.5% from 2003/04 and 19.0% from 2001/02. The increase reflects changes in diploma education at the Guelph campus resulting in a slight increase in agriculture diploma students but primarily in the enrolment of the second year Environmental Management intake. As a result the campus experienced the largest graduating class of students in the history of Ridgetown educational program offerings of 189 students in the spring and 42 in the fall graduation for a total of 231 students. Career opportunities continue to be excellent even under the current economic pressures at the farm gate with 99% of the 2005 Agriculture graduates finding employment. Employment for our Horticulture graduates was 90%, 83% in our first graduating Environmental Management class, and 74% in the Veterinary Technology graduating class.

New Initiatives

1. Diploma in Environmental Management

Students entered their second year of the new environmental Management diploma program. When designed it was felt that students would divide themselves equally between the two streams of Agriculture and Municipal/Industrial selections. Considerably more students selected the Municipal/Industrial stream emphasizing waste and water treatment courses. The first graduating class of 24 Environmental Management students proved successful in achieving an 83% employment rate.

2. Diploma in Greenhouse Vegetable Management

Several efforts have been made to generate interest in Ridgetown offering a greenhouse vegetable management diploma program. The industry group under the auspices of TOGA (The Ontario Greenhouse Alliance) was a new organization representing both the flower and vegetable sides of this industry. Due to the differences in philosophies between these industry segments agreements could not be reached at this time. A more recent attempt to raise awareness was a meeting with only the Ontario Vegetable Growers Association where the emphasis would only be on the vegetable interests. Further efforts are being considered although progress depends on further industry engagement.

3. Distance Education (DE)

Considerable efforts at the Ridgetown campus have been devoted towards an entirely new course delivery called a “blended” DE format. Three diploma courses were transformed into DE with the assistance from the Office of Open Learning including Greenhouse Management, Introduction to Landscape Construction and Landscape Design. Lectures were modified into this new web page offering along with new interactive laboratory assignments. These new course designs created considerable variety of learning experiences for our diploma students starting in the fall of 2005. An additional twist to DE was the opportunity to combine face-to-face laboratory and tutorial teaching techniques combined with the computerized web page lecture series. This new format we call “blended” DE offerings. Further, three other certificate courses are being developed as

DE courses to include Horticultural Weed Management, Golf Course Weed Management and Accounting Principles. Five Ridgetown staff have been involved with the development of DE and are finding new methods of packaging their course material to reflect the variety of learning experiences of distant and on-campus students. If the acceptance of this delivery system is found to be favourable to diploma students, more efforts will be devoted towards developing additional courses into DE formats.

4. Accreditation

The Veterinary Technology Program was extremely proud of being granted the American Veterinarian Medical Association (A.V.M.A.) accreditation, the only college in Canada to be awarded this prestigious American acknowledgement. This is in addition to accreditation by the Canadian Veterinary Medical Association (C.V.M.A.), Canadian Council of Animal Care (C.C.A.C.), Ontario Association of Veterinary Technicians (O.A.V.T) and the College of Veterinarians of Ontario (C.V.O.). Also the Ridgetown campus of the University of Guelph has been awarded an articulation agreement with Purdue University where the two year diploma courses at Ridgetown are being granted degree equivalents by Purdue University.

Further, articulation agreements are being negotiated with Olds College Alberta, University of Alberta to recognize all of the two-year Horticulture diploma courses as degree equivalents. This would allow a Ridgetown Horticulture graduate to receive a Horticulture degree with one additional year of academics and 4-months experiential learning to earn a degree in Horticulture.

5. Student and Employer Satisfaction

Each year; at graduation, all students are required to fill in an employment survey. This allows Ridgetown to follow how successful our recent graduates are in entering into the work force. Employment statistics at this time have been mentioned earlier in this report. Consequent to this, a 6-month call to employers of our students compile the worthiness of our most recent graduates. I am pleased to announce that with only a few exceptions the employers offer positive comments such as “they pick up on my particular working requirements very quickly”, students seem to be well trained as they have considerable background knowledge that needs only to be fine tuned for my particular needs”, “I would again employ another Ridgetown graduate”. The only mediocre statement in this recent survey is that the student was “ordinary”.

New Initiatives/Opportunities

Nutrient Management Training and Certification Program

In April, RC entered into a short-term Agreement (May 2005 to March 2006) with OMAFRA to provide logistics for nutrient management training courses, and to administer exams for nutrient management certification.

Updated Programs

Ontario Pesticide Education Program (OPEP):

OPEP continues to operate with the support of AGCare, MOE, OMAFRA, OABA, CropLife, Ridgetown College, University of Guelph and University of Guelph at large. OPEP is now in its 17th year of operation working to deliver effective pesticide safety training and certification for farmers, agricultural assistants and vendors.

Ag Business Centre (ABC):

The Ag Business Centre continues to partner with Economic Development Services of Chatham-Kent, and Sarnia Lambton Economic Partnership. The Ag Business Centre provides office space for Kent Federation of Agriculture, Tallgrass Ontario, Ontario Maple Syrup Producers Association and the Fresh Vegetable Growers of Ontario. In the past year, ABC has hosted public information sessions on *Alternative Energy: Power to the People*, and *Effective Meetings*; provided administrative and registration support to the annual *South West Ag Conference* and *South Western Ontario Pork Conference* in partnership with OMAFRA, producers and industry; and co-ordinated two agricultural awareness programs: *Rotary Career Adventure*, and *Harvest Days*. The ABC provided facilitation services for the Ontario Horticultural Educators Committee (OHEC). The ABC also provides French Support services to other programs on campus.

Conference & Facility Services:

Conference and Facility Services continues to coordinate facility bookings for both internal and external groups on our campus, utilizing campus facilities when they are not being used to capacity by students. This includes numerous overnight summer conferences, and day meetings and a growing number of special events throughout the year.

Livestock Medicines Education Program

BDTG staff continue to work with the industry-led Ontario Livestock Medicines Education Program (LMEP) to deliver training programs on the safe use of livestock medicines on farm. Our target audience is primarily dairy producers, since Dairy Farmer's of Ontario have made certification mandatory for their producers. Several courses per year are offered to other commodity groups. The necessary statutory amendments to the Livestock Medicines Act that would allow regulations to be passed to make certification mandatory for all producers have not yet been passed. Enrolment in this program will continue to be low until that happens.

Ontario Pesticide Training and Certification Program

Ridgetown College administers pesticide training & certification for candidates who wish to apply to the Ontario Ministry of the Environment (MOE) to become Licensed Exterminators through a Memorandum of Understanding with MOE. Issues surrounding the environmental impact of pesticides for cosmetic use in landscapes will continue to impact participation in the program. Because of the continued West Nile Virus threat, there is still the need for Licensed

Exterminators to protect public health. The cost of delivery of the program (e.g. courier charges) may necessitate a re-evaluation of certification fees.

Development of Nutrient Management Training Material

We are continuing to work with Nutrient Management Branch, OMAFRA, to complete development of course material required under the Nutrient Management Act and Regulation. This course will constitute one of the core training requirements for brokers and land application businesses who require licences or certificates under the NMA to apply prescribed materials to land.

MOE Grandparented Operator Exam Preparation Course

BDTG has been working with the Ministry of Environment to carry out logistical and registration management functions for courses for grandparented operators preparing for certification exams for water treatment and distribution. This is a two year contract that will continue until winter, 2006.

IPM Accreditation Program

This voluntary program has been developed by the IPM-PHC Council of Ontario to recognize landscape companies, park systems, and golf courses who demonstrate their knowledge of and commitment to the principles of IPM through a process of certification, audit, and professional development. Ridgetown College has a program administration contract with the IPM-PHC Council. The program has been able to acknowledge some companies with full Accreditation - Level II status, as a result of the commencement of On-Site Audits. A review of administrative fees will be necessary to ensure program success.

2.2 Diploma Education Budget

Table 2.2.1: Diploma Education Program – Comparison of Direct Expenditures * 2004/2005 and Previous Fiscal Year (in thousand's of dollars)

Program	Alfred		Kemptonville		Ridgetown		Guelph		Totals	
	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual	03/04 Actual	04/05 Actual
Agriculture	645	606	429	391	606	548	400	1	2,080	1,546
Horticulture	-	-	170	88	418	469	320	-	908	557
Food and Nutrition Management	156	164	341	322	-	-	-	-	497	486
Equine	-	-	258	-	-	-	-	-	258	-
Vet. Tech.	180	218	-	-	798	822	-	-	978	1,040
Turf Mgmt	-	-	-	-	-	-	104	242	104	242
Ent'l Mgmt	9	-	-	-	225	318	-	-	234	318
Sub-total: Dipl. Ed. Sub-Programs *	990	988	1,198	801	2,047	2,157	824	243	5,059	4,189

* Direct Expenses DO NOT include Academic Support Services or Institutional Infrastructure and Overhead support. These data are presented only to provide a year-to-year comparison of base costs of the sub-programs.

2.3 Diploma Education Program Performance Measures

Objective	Measure/Activity	Result
1, A, B, C Deliver high quality education and training programs that meet the needs of the Ontario agri-food and rural sectors.	A. Deliver programs using the most current knowledge and skills available through effective teaching programs B. Develop MTCU-style program measures and standards. C. Report annually on: - % student satisfaction - satisfaction of employers with graduates hired - percentage of graduates finding full-time employment Maintain enrolments, graduations, employment levels and satisfaction of students and employers. Reduce attrition rates.	A. Ridgetown campus delivered four diploma programs including Agriculture, Horticulture, Environmental Management and Veterinary Technology (2 programs). The measure of success is the record number of graduates in the spring of 2005 and again in the fall of 2005 for a total of 198 diploma students. A second measure of success is the strong commitment student's display by record enrolments again this spring (2005) into these diploma programs. Ridgetown continues to offer programs pertinent to the student marketplace with outstanding job placement and satisfaction. B. Ridgetown staff have been involved in supplying the pertinent measures and standards for both the Agriculture and Horticulture diploma programs. The Veterinary Technology measures and standards are in place as this program is an accredited program through the OVMA. Kemptville College has a professionally certified program in Food, Nutrition & Risk Mgt. Accredited programs; with a list of Performance Measures, are being followed at each location. C. Through the student course evaluation process that takes place at the end of each semester, students have the opportunity to record their satisfaction or otherwise with each particular course. Ridgetown is pleased to read over the assessments with an over all assessment of 83% student satisfaction. Ridgetown has each of the diploma program coordinators telephone the previous years current employers asking what level of satisfaction they would offer for the record. Each of the coordinators reported a 100% job satisfaction with employer commenting that they would again hire a Ridgetown graduate. We were extremely pleased with the outcome of this survey. Career opportunities continue to be excellent even under the current economic pressures at the farm gate with 99% of the 2005 Agriculture graduates finding employment. Employment for our Horticulture graduates was 90%, 83% in our first graduating Environmental Management class and 74% in the Veterinary Technology graduating class. Enrolments across the 4 locations offering Diploma Programs were down by 12.8%, as the Agriculture and Horticulture Diplomas were no longer offered at Guelph. However, counting only the Alfred, Kemptville and Ridgetown campuses, enrolments were up by 1.8% from the previous year. Also as a result of the above, graduations declined by 25% in 2004/05. Employment and satisfaction levels were maintained. Attrition levels were comparable or reduced slightly from 2003/04 levels.
2 Strategy identifying new and regionally differentiated directions for education and training programs	By April 2004, complete Strategy, for presentation to Executive Committee	Dr. Craig Pearson, Dean of OAC, reported to the Executive Committee the status of the Alfred College proposal of a new French language course at Orleans and Dairy training at Kemptville College. Planning for both is still underway.

Objective	Measure/Activity	Result
3 Increase College revenues through partnerships with industry or other educational institutions	Demonstrate positive growth in non-OMAFRA revenues over the 5-year term of the Agreement. Report annually on % change in non-OMAFRA funding.	Non-OMAFRA Revenues related to Diploma Programs and Continuing Education/Business Development & Training programs increased by \$77k, to \$10.33 million in 2004/05. This is an increase of 0.8% over 2003/04.
4 Continuing Education Programs	Expand CE Programs on a cost recovery basis, meeting regional needs. Track and report cost recovery status of CE Programs. Maintain 2001/02 levels of CE revenues	Revenues for Continuing Education/Business Development & Training programs increased slightly, compared to the previous year, topping \$5 million in 2004/05. In 2001/02, the reported CE/BDT revenues were \$3.27 million. Total net expenditures reported in 2003/04 were comparable to the 2001/02 level.
5 A, B Financial Accountability	Report annually on: - Annual average cost per diploma student - Annual cost per student by Diploma Program Maintain or decrease cost per student from 2001/02 level.	The 'Net Cost per Student' (based on Total Net Expenditures per Student) increased for all Diploma Programs, with the exception of the Horticulture and Vet. Tech. program relative to 2003/04. See table 2.3.7 for details.

Enrolments

Table 2.3.1: Summary of Diploma Program Enrolments (Full-time students)

	Alfred	Kemptville	Ridgetown	Guelph	Total	Change
2004/2005	113	217	464	63	857	-12.8%
2003/2004	128	254	398	203	983	-7.5%
2002/2003	115	229	360	359	1,063	3.3%
2001/2002	109	223	341	356	1,029	-2.3%
2000/2001	111	238	323	381	1,053	1.6%
1999/2000	87	251	348	350	1,036	-8.0%
1998/1999	94	293	347	392	1,126	0.2%
1997/1998	112	272	316	424	1,124	1.8%
1996/1997	111	295	297	401	1,104	8.2%

Graduation Statistics

Table 2.3.2: 2003/2004 Graduates

Diploma Program	Alfred		Kemptonville		Ridgetown		Guelph		Total	
	03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05
Agric. - Graduates - % Employed	23 100%	23 88%	51 95%	71 96%	69 100%	83 99%	128 N/A	--	271	177
Horticulture - Graduates - % Employed	2 unknown	1 100%	12 90%	5 100%	16 93%	21 90%	41 N/A	26* 100%	71	
Envir. Mgt. - Graduates - % Employed					--	24 83%				24
Food - Graduates - % Employed	7 72%	3 100%	14 90%	25 70%	-- --	-- --	-- --	--	21	28
Equine - Graduates - % Employed	-- --	-- --	22 95%	0	-- --	-- --	-- --	--	22	0
Vet Tech - Graduates - % Employed	20 100%	21 95%	-- --	-- --	36 86%	37 74%	-- --	--	56	58
Total - Graduates - % Employed	52 96%⁽¹⁾	48 92%	99 93%	101 90%	121 95%	165 83%	169 N/A	26 100%	441	340

⁽¹⁾ Students that have not been able to be reached after 3 tries have not been included in the calculation of % Employed

Similarly; students pursuing further studies have not been included in the calculation of % Employed

* First graduating class from the Turfgrass Diploma Program at Guelph

Table 2.3-3: Attrition Rates for 2003 and 2004 Diploma Cohorts (2-year programs)

Table 2.3.3a: 2003 Cohort

	Alfred	Kemptville	Ridgetown	Guelph	Total
# Enrolled in Fall '03	54	138	204	31	427
# Enrolled in Fall '04 ⁽¹⁾	42*	106	178	29	355
# Graduated	35*	99	165	26	325
Attrition in Year 1	21%	23%	13%	6.5%	17%
Attrition in Year 2	17%	7%	7%	10%	8%
Total Attrition	34%	28%	19%	16%	24%

⁽¹⁾ Actual enrolments in Fall '04 (Numbers shown in 2003/04 Annual Report for Fall '04 were pre-registration enrolment data).

* 1 student from the 2003 cohort completed her program in 2 semesters; therefore, these stats are not included in Fall 04 and Grad stats

Table 2.3.3b: 2004 Cohort

	Alfred	Kemptville	Ridgetown	Guelph	Total
# Enrolled in Fall 2004	58	111	198	34	401
# Enrolled in Fall 2005 ⁽¹⁾	50	95	192	33	370
Attrition Year 1	14%	14%	3%	3%	8%

⁽¹⁾ **Figures for Fall 2005 are based on pre-registration numbers**, which may not reflect actual enrolments accurately.

Table 2.3.4: Summary of Attrition Statistics – 2 year Diploma Program

	Alfred	Kemptville	Ridgetown	Guelph	Total
<u>Attrition in Year 1</u>					
2004 cohort	14%	14%	3%	3%	8%
2003 cohort	17%	20%	14%	6.5%	16%
2002 cohort	21%	18%	7%	19%	16%
2001 cohort	19%	25%	5%	7%	12%
2000 cohort	17%	24%	13%	2%	12%
1999 cohort	0%	30%	19%	4%	15%
<u>Attrition in Year 2</u>					
2004 cohort	n/a	n/a	n/a	n/a	n/a
2003 cohort	17%	7%	7%	10%	8%
2002 cohort	21%	15%	9%	0.6%	9%
2001 cohort	12%	23%	14%	17%	17%
2000 cohort	3%	15%	12%	6%	9%
1999 cohort	22%	24%	15%	16%	18%
<u>Total Attrition</u>					
2004 cohort	n/a	n/a	n/a	n/a	n/a
2003 cohort	34%	28%	19%	16%	24%
2002 cohort	29%	30%	15%	20%	24%
2001 cohort	29%	42%	19%	24%	27%
2000 cohort	20%	35%	24%	8%	20%
1999 cohort	22%	47%	31%	20%	31%

Table 2.3.5: Attrition Rates for 3-year Vet. Tech. Program at Ridgetown

The summer Vet. Tech. program is a three-year course, so the numbers cannot be included with the two-year program numbers. This table summarizes the enrolments and attrition rates for this program.

Summer Vet Tech Cohorts Summer Vet Tech Cohorts

	Cohort Year					
	1998	1999	2001	2002	2003	2004
# Enrolled in Fall 1998	36					
# Enrolled in Fall 1999	25	40				
# Enrolled in Fall 2000 ⁽¹⁾	24	34				
# Enrolled in Fall 2001		31	40			
# Enrolled in Fall 2002			30	43 ⁽²⁾		
# Enrolled in Fall 2003 ⁽¹⁾			27	35	0 ⁽¹⁾	
# Enrolled in Fall 2004				35		45
# Enrolled in Fall 2005						39
Graduated	24	31	27	32		
Attrition in Year 1	31%	15%	25%	19%		13%
Attrition in Year 2	4%	9%	10%	3%		
Attrition in Year 3	0%	0%	0%	0%		
Total Attrition	33%	23%	33%	11%		

⁽¹⁾ No intake of Vet. Tech. students in Fall 2000 and 2003 due to space limitations.

⁽²⁾ This number is adjusted from the 2001/2002 Annual Report to reflect actual enrolment rather than pre-registration numbers.

Table 2.3.7: 2004/2005 Teaching Cost ⁽¹⁾ per Student by Program (in thousand's of dollars)

	<u>DIPLOMA PROGRAMS</u>						
	<u>AGRI</u>	<u>ENV'T</u>	<u>FOOD</u>	<u>HORT</u> ⁽³⁾	<u>TURF</u>	<u>VET TECH</u>	<u>TOTAL</u>
<u>SUMMARY</u>							
NUMBER OF STUDENTS SEPTEMBER 2004	401	60	63	59	63	211	857
TOTAL EXPENDITURES ^(1 AND 2)	2,636	420	778	703	298	1,571	6,405
TOTAL EXPENDITURES / STUDENTS	6.6	7.0	12.3	11.9	4.7	7.4	7.5
REVENUES	1,153	178	174	178	265	783	2,732
TOTAL NET EXPENDITURES ^(1 AND 2)	1,483	242	603	525	33	788	3,673
TOTAL NET EXPENDITURES / STUDENT	3.7	4.0	9.6	8.9	0.5	3.7	4.3
LOCATIONS WHERE PROGRAM IS OFFERED:							
ALFRED	✓	✓	✓			✓	
KEMPTVILLE	✓		✓	✓			
GUELPH	✓			✓	✓		
RIDGETOWN	✓	✓		✓		✓	

⁽¹⁾ 'Teaching Costs' include direct costs plus allocated academic services plus location infrastructure and support but exclude both location ancillary costs (cafeteria, residence) and allocated institutional service costs.

⁽²⁾ Utility and maintenance costs, normally included in infrastructure costs only at Collège d'Alfred, have been removed from Alfred's costs to allow direct comparison of Cost per Student to other Colleges.

⁽³⁾ There was no Junior Year intake of students into the Horticulture Diploma Program at Kemptville in fall 2004.

TABLE 2.3.8: 2002/2003 VALUE OF DIPLOMA STUDENT ASSISTANCE

	ALFRED		KEMPTVILLE		RIDGETOWN		GUELPH		TOTAL	
	03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05
STUDENT AWARDS (\$)	32,475	31,680	56,875	60,268	43,000	55,175	50,822	2,000	183,172	149,123
VALUE OF AWARDS (\$) PER STUDENT	304	356 ⁽¹⁾	224	278	108	121	226	59	186	174

⁽¹⁾ Number of students who received awards = 89 (\$31,680 divided by 89 equals \$356)

2.4 Business Development Training

- Activities for Business Development Training are funded through contracts and certificate courses (including residential programs of up to one academic year), with the objective of attaining cost self-sufficiency.

Table 2.4.2: Student Days and Range of Fees/Student Day for C.E. Courses.

	Alfred		Kemptonville		Ridgetown		Total	
	03/04	04/05	03/04	04/05	03/04	04/05	03/04	04/05
# of Student Days (6 hrs/day)	5,632	4,484	19,198	21,736	16,971	18,548	41,801	44,768
Diploma Student Equivalent ⁽¹⁾	47	37	160	181	141	155	348	373
Fees/day (\$) ⁽²⁾	30 - 600	30 - 800	75 - 140	75 - 190	50 - 200	500-200		

⁽¹⁾ Calculation: Divide number of student days by 120 (the number of days in a student year)

⁽²⁾ This shows the range in course fee charges, per day, to provide some contextual comparison from year-to-year and location-to-location.

2.5 Veterinary Clinical Education Program

2.5.1 An Overview

The Veterinary Clinical Education Program (VCEP) Agreement provides annual base funding to the Ontario Veterinary College (OVC) to meet the continuing needs for:

- “veterinary graduates who have a high level of appropriate clinical experience in veterinary medicine to service Ontario animal owners”;
- “an animal referral hospital which will service satisfactorily Ontario’s veterinary practitioners and animal owners”.

2.5.2 Objectives of the Program

- A. Meet the accreditation requirements of the Canadian and American Veterinary Medical Associations as well as the College of Veterinarians of Ontario,
- B. Provide the clinical education component for veterinary students in the Doctor of Veterinary Medicine undergraduate program,
- C. Operate the Veterinary Teaching Hospital clinics including large animal, small animal, field service and diagnostic laboratories,
- D. Offer a one-year post-graduate Veterinary Internship Program in the large animal and small animal clinics,
- E. Offer an advanced clinical training program entitled Doctor of Veterinary Science (D.V.Sc.) in various medicine and health maintenance disciplines,
- F. Offer an externship program of approved clinical experience with a private veterinary practitioner or a relevant public/private sector organization,
- G. Offer referral and emergency veterinary services to Ontario veterinary practitioners and the animal-owning public. These include medicine and health maintenance services.

2.5.3 Resource Allocation

To meet the objectives of the VCEP agreement, VCEP funds were allocated to three programs: the Clinical Education Program (Objectives A to D and G), the D.V.Sc. Program (Objective E) and the Externship Program (Objective F). Table 2.5-1 summarizes the program’s objectives, budget and expenditures. The total available VCEP budget in 2004/05 was \$4,704,248. For the year ending April 30, 2005 expenditures totalled \$4,728,900 leaving a balance of (\$24,652). Of this budget, \$3,971,001 went towards the Clinical Education Program (CEP), \$506,680 to the D.V.Sc. program and \$251,218 to the Externship Program.

The CEP portion of VCEP funded 11.86 faculty FTEs in the Departments of Clinical Studies and Population Medicine. These faculty positions support teaching and service in large animal medicine and surgery, anaesthesia, dairy, beef, sheep and swine health management and theriogenology. It also supported 1 professional staff, 21 support staff, 5 internship students and 3 staff veterinarians in the Veterinary Teaching Hospital.

The D.V.Sc. portion provided funding for 23 of the College's 39 D.V.Sc. students. The Externship portion of VCEP provided support for the student relocation allowance, organizational support staff, operating expenses and insurance, needed to deliver the course. The latter 8 week fourth year course is generally taken during the spring semester and is compulsory for all DVM students.

Table 2.5.1: VCEP Budget and Expenditures for Core Strategic Programs by Objective: 2004/2005

Programs	Objectives ⁽¹⁾	Expenditures Compared to Budget 2004/2005	
Clinical Education	A Meet accreditation requirements	Personnel	3,516,554
	B Provide clinical education component for veterinary students in the DVM Program	Operating Costs	<u>454,447</u>
	C Operate the veterinary teaching hospital	Total	3,971,001
	D Offer a one-year internship program	Budget	<u>3,944,607</u>
	G Offer referral and emergency veterinary services to practitioners and animal owning public in Ontario	Balance	<u>(26,394)</u>
DVSc	E Offer an advanced clinical training program entitled Doctor of Veterinary Science	Support for DVSc's	506,680
		Budget	<u>506,680</u>
		Balance	<u>-</u>
Externship	F Offer an externship program of approved clinical experience	Support for External Program	251,219
		Budget	<u>252,961</u>
		Balance	<u>1,742</u>
Grand Total		Total Expenditures	4,728,900
		Budget⁽²⁾	<u>4,704,248</u>
		Balance	<u>(24,652)</u>

⁽¹⁾ See section 2.5.2 for complete objective descriptions

⁽²⁾ Total includes a carry-forward of \$4,218 from 2003/04

Performance Management Agreement

2.5.4 CLINICAL EDUCATION PROGRAM

In compliance with Objectives A, B, C, D, and G of the VCEP Agreement, the OVC delivers a Clinical Education Program. To support this program, VCEP funding is allocated in the VTH and the three academic departments involved in clinical education: Pathobiology, Clinical Studies and Population Medicine.

Clinical Education is the largest component of the VCEP agreement. This program supports the clinical training of DVM students within the VTH. Clinical experience is gained in the various VTH services that include clinics in the large animal and small animal areas, and a field service program. Additionally, the Hospital offers referral and emergency services to veterinary practitioners and the animal-owning public for 24 hours a day, 365 days of the year. One hundred and six students were enrolled in the final year program in 2004/05

Objective A: Meet the accreditation requirements of the Canadian and American Veterinary Medical Associations (CVMA, AVMA) as well as the College of Veterinarians of Ontario (CVO).

Performance Measures and Targets

Objective: To meet the accreditation requirements of the Canadian and American Veterinary Medical Associations as well as the College of Veterinarians of Ontario;

Expectation: The OVC will maintain its accredited status with the CVMA/AVMA, CVO and AAHA indefinitely.

Measurement Instrument:

- DVM Program assessment by the Council of Education of the American Veterinary Medical Association (AVMA).
- Annual Report sent to Council on Education of the AVMA.
- Accreditation of relevant clinics of the Veterinary Teaching Hospital (VTH) by the College of Veterinarians of Ontario.
- Accreditation status of relevant sections of the VTH, small animal clinical facilities, personnel and equipment by the American Animal Hospital Association (AAHA).

2004/2005 Outcome:

The OVC was granted full accreditation after the AVMA Council of Education site visit in February 2002 for a period not to exceed seven (7) years.

The AVMA accreditation process was developed to ensure quality professional veterinary education. The process uses periodic accreditation reviews to determine the degree to which the College meets a described set of standards as well as its own stated mission and objectives. The AVMA standards are recognized globally. This accreditation is crucial for the OVC to maintain its international reputation, to recruit candidates, to serve its mandate of teaching, research and service and to subsequently train veterinarians to meet the needs of the Province of Ontario.

The College of Veterinarians of Ontario (CVO) administers the Veterinarians Act. One requirement for licensure in Ontario is graduation from an AVMA/CVMA accredited college. In addition, no person can provide service from a veterinary facility unless the facility is CVO accredited. The VTH could not legally operate its various clinics without CVO accreditation. A site visit and inspection was conducted by the CVO in February 2002, with the next inspections scheduled for 2007. The VTH met all accreditation requirements for the small animal, food animal and mobile units.

Objective B: Provide the clinical education component for veterinary students in the Doctor of Veterinary Medicine undergraduate Program.

Outcome assessment is now an integral part of the AVMA accreditation standards. In addition to the performance measures of the VCEP agreement the OVC has established additional performance measures to monitor student performance with a view to ongoing enhancement of its programs.

Performance Measures and Targets

Objective: To determine the degree of employer's satisfaction with new DVM graduate's performance in the workplace within the first year after graduation

Expectation: That greater than 80% of employers surveyed will express satisfaction with New Graduate Performance in the Workplace during the first year following graduation from the OVC.

Measurement Instrument: Employer Questionnaire

Employers of graduates of OVC 2004 were mailed questionnaires in August 2004. These veterinarians were asked to evaluate their new employee's overall performance / competence to do the job for which he/she was hired as: Superior, Very Good, Good, Poor (marginal but acceptable) or Very Poor (unacceptable or unsatisfactory performance).

2004/2005 Outcome:

The response rate to the survey was 57%. Of the employers who responded 98% were satisfied (i.e. rated new graduates as Superior, Very Good, or Good) with their employee's overall performance/competence, three to five months after graduation, to do the job for which they were hired.

Objective: To determine OVC graduates' perception/assessment of their preparedness for the job opportunities and responsibilities encountered in the workplace

Expectation: That greater than 80% of the graduates surveyed would express satisfaction with their performance in the workplace during the first year following graduation from OVC.

Measurement Instrument: New Graduate Survey

Graduates of OVC 2004 were mailed questionnaires in August 2004. They were asked to evaluate their own overall performance / competence to do the job for which they were hired as: Superior, Very Good, Good, Poor (marginal but acceptable) or Very Poor (unacceptable or unsatisfactory performance).

2004/2005 Outcome:

The response rate to the survey was 50%. Of new graduates who responded, 80% were satisfied (i.e. rated their performance as Superior, Very Good, or Good) with their overall performance / competence, three to five months after graduation, to do the job for which they were hired

Objective C: Operate the Veterinary Teaching Hospital clinics including large animal, small animal, field service and diagnostic laboratories.

Performance Measures and Targets

Objective: To provide a reasonable volume of cases and teaching animals for student learning.

Expectation: A reasonably stable caseload of both client cases and teaching animals is maintained to allow instructors to teach with real clinical cases.

Measurement Instrument:

VTH statistics

2004/2005 Outcome:

Caseload in the Veterinary Teaching Hospital	2004/05	2003/04
Small Animal Client Admissions	12,447	12,567
Large Animal Client Admissions	1,708	1,986
Ruminant Field Service, Farm Visits	1,684	1,799

As shown above, the provision of on farm large animal services continues to be an area of emphasis.

Objective D: Offer a one-year post-graduate Veterinary Internship Program in the Large and Small Animal Clinics.

A one-year internship involves specialization in either the VTH's Small or Large Animal Clinics. Interns are usually new or recent graduates wishing to increase their level of discipline skills in an academic environment or to use this experience to help gain entry to more advanced graduate programs (i.e. D.V.Sc., Residency). Experienced veterinarians may choose an Internship to help them upgrade their level of knowledge or reorient their career path after some time spent in practice. The interns are paid a stipend of \$22,000 per year. Currently VCEP funds support six interns. Revenue from the VTH funds an additional nine interns.

Performance Measures and Targets

Objective: To provide the graduate intern with a more competitive ability for acquiring a job, either in practice or in a residency program.

Expectation: At least 30% of the Interns that applied for residencies are successful in their application, and 70% of the Interns that applied to specialty practices are successful in their application.

Measurement Instrument: Exit Survey

At the end of the program VTH Interns are surveyed as to their employment location and type of job for the upcoming year. Success rate in terms of obtaining a Residency will also be obtained.

2004/2005 Outcome:

As of June 2005, nine (9) of fifteen (15) Interns were successful in obtaining residency programs and six (6) obtained employment in private practice.

Objective G: Offer referral and emergency veterinary services to Ontario veterinary practitioners and the animal-owning public. These include medicine and health maintenance services.**Performance Measures and Targets**

Objective: To meet the mandate as a full-service veterinary referral/emergency resource for the Province of Ontario. This service includes both emergency referral and elective referral services. The emergency service is available for 365 days / year, 24 hours / day for all common domestic species.

Expectation: All emergency referrals and 95% of all elective referrals will be accommodated by the Veterinary Teaching Hospital. Specialty services will be available for referral by Ontario veterinarians.

Measurement Instrument:

VTH statistics

2004/2005 Outcome:

2004/2005 Client Referral Caseload		
	Small Animal Client Cases	Large Animal Client Cases
Elective	10,418	1,028
Emergency	2,029	680
Total	12,447	1,708

2004/2005 Specialty Service Referral Caseload			
Small Animal Clinic		Large Animal Clinic	
Chemotherapy	1,051	Colic Management	288
Radiation Therapy	505	Theriogenology	40
Nuclear Medicine	36	Foal Intensive Care	104
Cardiology	1,282	Cardiology	71
Diagnostic Ultrasound	1,433	Bovine Surgery	23
Intensive Care	1,768	Diagnostic Ultrasound	325
Neurology	917	Nuclear Medicine Bone Scan	115
Dermatology	711	Neurology	110
Theriogenology	386	Respirology	131
		Diarrhea Management	75

2.5.5 Externship Program

In compliance with Objective F of the VCEP Agreement, the OVC delivers an Externship Program.

Objective F: Offer an Externship Program of approved clinical experience with a private veterinary practitioner or a relevant public/private sector organization.

Performance Measures and Targets

Objective: To assess progress in achieving stated learning objectives during the Externship Course.

Expectation: That a statistically significant improvement in mean clinical performance scores will be achieved in most categories tested over the course of the Externship Course.

Measurement Instrument: Interim and final evaluation questionnaires.

Joint interim and final evaluation questionnaires were used for this assessment. These questionnaires, which were completed by the externship student together with his/her Externship Course host, assessed 82 activities in large animal private primary care practice and 100 clinical activities in a small animal private primary care practice. Assessed activities included the ability to collect a relevant and accurate history, physical examination of an animal, formulation of a differential diagnostic problem list, development of a treatment plan and development of preventive strategies for common diseases and other problems encountered in domestic animals.

For the summer of 2004 (OVC '05) the improvement in students' clinical performance over the eight-week placement involved in the Externship Course was similar to that reported over the previous five years. Again, data collected for the class of OVC '05 reflected considerable consistency in the clinical capabilities of OVC students at the end of their third year of the professional program. Some areas that did not show improvement did not do so because case numbers were too few.

Summaries of the data on which these comments are based are available on request.

2004/2005 Outcome:

Statistically significant improvement in clinical performance scores was achieved in 161/182 of the categories or activities assessed.

Objective: To assess the extern's knowledge base and skills at the end of the Externship Placement.

Expectation: That 100% of the students will perform at a satisfactory ("C" grade) level or higher.

Measurement Instrument: Host Practitioner Evaluations.

Host practitioners evaluated their extern's clinical capabilities in terms of diagnostic process skills, delivery of veterinary care, technical skills and professional conduct at the end of the Externship Placement. Each student in the class (n=100) achieved a score of 80% or higher.

Copies of the assessment forms and the analyses are available upon request.

2004/2005 Outcome:

One hundred percent of the class of OVC '05 (Summer '04 Externship) performed at better than a "C" grade level.

2.5.6 D.V.Sc. PROGRAM

In compliance with Objective E of the VCEP Agreement, the OVC delivers the D.V.Sc. Program.

Objective E: Offer an advanced clinical training program entitled **Doctor of Veterinary Science in various medicine and health maintenance disciplines.**

Performance Measures and Targets

Expectation: At least 90% of the students will complete the program successfully in approximately three years.

Measurement Instrument: University of Guelph graduate student registration data

2004/2005 Outcome:

During 2004/05 11 D.V.Sc. students funded from all sources completed the program. Details of department and discipline, regarding new students, in-course students and graduates are outlined in Table 2.5.6-1.

The normal duration of the D.V.Sc. program, and funding support, is nine semesters (three years). The College maintains the equivalent of one stipend in “reserve” to deal with one-semester extensions when needed to complete the thesis. Occasional students receive an additional semester of support if a formal request is made by the faculty Advisor and Advisory Committee.

Table 2.5.6.1: D.V.Sc. Total New Students, Enrolment and Graduations During 2004/05

Department	Discipline	New Students +	Enrolment*	Graduations
Pathobiology	Anatomic Pathology	1	6(4**)	1(1**)
	Clinical Pathology	1(1**)	3(2**)	1(1**)
	Zoo Medicine	1	2(1**)	1
	Laboratory Animal Science	0	2(0**)	
	Comparative Pathology and Other		3(1**)	
	Total Pathobiology	3(1**)	16(8**)	3(2**)
Clinical Studies	Anesthesiology		1(1**)	1(1**)
	Companion Animal	1	8(4**)	3(1**)
	Large Animal	2(1**)	5(4**)	2(2**)
	Cardiology and Radiology	1	2(1**)	1(1**)
	Total Clinical Studies	4(1**)	16(10**)	7(5**)
Population Medicine	Theriogenology		2(2**)	
	Health Management		4(3**)	
	Total Population Medicine	0	6(5**)	0
Biomedical Sciences	Total Biomedical Sciences	0	1(0**)	1(0**)
OVC Total		7(2**)	39(23**)	11(7**)

Table includes all new D.V.Sc. students for the period May 1, 2004 to April 30, 2005.

* Based on Winter 2005 enrolment. Actual enrolment varies slightly over the three semesters.

+ Based on Fall 2004 enrolment. Most new students start in the Fall semester.

** VCEP supported students.

Expectation: Enrolment in the D.V.Sc. Program should be at least 20 students

Measurement Instrument: University of Guelph graduate student registration data

2004/2005 Outcome:

The College's D.V.Sc. program had 23 VCEP funded positions, (based on 2/3 VCEP, 1/3 MTCU agreed split) with the remainder funded from other sources. Table 2.5.6-2 includes all new D.V.Sc. students and graduates for period May 1, 2004 to April 30, 2005.

Table 2.5.6.2 D.V.Sc. Graduate Student Placements 2004-2005

Department	Discipline	Graduate Placement
Biomedical Sciences	Internal Medicine	Private Referral Practice, Ottawa
Clinical Studies	Small Animal Medicine	Staff Veterinarian OVC Faculty, Thailand*
	Large Animal Surgery	Faculty, Brazil*
	Large Animal Medicine	PhD Program, Pathology, OVC*
	ICU	Private Specialty Practice, Toronto*
	Small Animal Surgery	Private Specialty Practice, Toronto*
	Anaesthesia	Faculty, Malaysia*
Pathobiology	Anatomic Pathobiology	Clinical Instructor, Biomedical Sciences and Pathobiology, Blacksburg, VA*
	Clinical Pathology	Scientist, Gribbles Alpha Scientific Laboratories, New Zealand*
	Zoo Medicine	Staff Veterinarian, Zoo, Norway

Table includes all graduate placements for the period May 1, 2004 to April 30, 2005.

* VCEP supported students.

3. LABORATORY SERVICES DIVISION

3.1 Highlights

- The Laboratory Services Division (LS) provides testing and diagnostic services in support of OMAFRA's regulatory and disease surveillance programs. In addition, LS is expected to generate sufficient funds to replace and upgrade its infrastructure, including facilities and technical capabilities. In order to generate reinvestment funds, LS provides testing services on a fee-for-service basis to government, universities and the veterinary and agri-food industry.
- The Animal Health Laboratory performed approximately 586,000 procedures (one or more tests per procedure) in support of disease surveillance while the laboratories at 95 Stone Road performed approximately 970,000 tests in support of the regulatory programs. Each test generated a reportable result.
- During 2004/05, activities focused on expanding the number of individual test methods that are accredited to an ISO 17025 standard. This was a major effort and 46 new tests were accredited.
- The sample and data management automated system for the raw cow's milk program, was upgraded. The new system was implemented in November. This was a joint project involving the Dairy Farmers of Ontario, the Ontario Dairy Council, the Ontario Milk Transporters Association, the Ontario Ministry of Agriculture and Food and Rural Affairs, and the Laboratory Services Division.
- In 2004/05 the revenue from external clients decreased from the previous year. The decrease is due to strong competition from private sector laboratories in areas that were traditionally serviced by the Laboratory Services Division combined with economic pressures in the livestock industry. The federal government initiated a new plum pox program, but the revenue from this project was lower than in previous year.
- Careful management of costs combined with business development efforts allowed Laboratory Services to re-invest \$1.5 million into infrastructure and capabilities. The investments included new diagnostic and analytical equipment as well as facilities upgrades and repairs.
- OMAFRA's testing requirements have continued to evolve. During 2004/05 there were a number of in-year changes to the regulatory testing programs as OMAFRA programs changed to reflect current needs. The BSE testing was converted to a rapid method and the scope of testing was expanded. In addition to support for the disease surveillance and regulatory programs, Lab Services supported a number of studies.

3.2 Budget

The Laboratory Services Division (LS) provides testing and diagnostic services to public and private clients in the agriculture, food and veterinary industries. This report deals with those services that LS provides under the terms of the OMAFRA/UofG Agreement. The report describes the testing services provided to the Food Industry Division (FID) and the Agriculture and Rural Division (ARD) of OMAFRA and the diagnostic services carried out on behalf of the Livestock Technology Branch of ARD.

Under the terms of the OMAFRA/UofG Agreement, the Laboratory Services Division receives funding for the specific testing services described previously. In addition, LS is required to earn sufficient additional income to replace and upgrade its infrastructure. To that end, LS provides testing, on a fee-for-service basis, to various clients in the public and private sector. It is estimated that LS must reinvest at least \$1.5 million per year in infrastructure replacement and upgrades in order to maintain the current level of capabilities to meet OMAFRA's testing requirements. This does not cover the needs for expansion of testing capabilities to deal with emerging problems and regulatory requirements. As needs evolve, additional investment is required to acquire the new technology to meet increasingly complex test requirements.

Table 3.2.1: Financial Results (for the year ended April 30, 2005) (in millions of dollars)

	03/04	04/05
Expenditures	Actual	Actual
Animal Health Labs	\$5.3	\$6.1
Analytical Services*	2.5	4.7
Regulatory Services*	4.8	3.5
LSD I&S	2.7	3.0
Reinvestment	3.6	1.5
Total Direct Expenses	18.9	18.8
Revenue (external clients only)	11.0	9.1
OMAFRA Funding	9.0	9.0
Carry forward surplus & other funding	1.3	2.4
Total Funding	21.3	20.5
Surplus/(Deficit)	2.4	1.7

* An internal reorganization between the 2 departments occurred to better serve client needs and the increase in AS cost in 2004/05 was related to PPV.

Laboratory Services had another successful year financially. Financial performance included the following:

- Revenues from external clients of \$9.1 million exceeded Budget by \$0.3 million. The revenue is down from the previous year due to strong competition driving down pricing and the completion of some major revenue generating contracts.
- Reinvestment of \$1.5 million is below budget by \$0.2 million. This is due in part to delays in selecting or negotiating purchases.
- LS began the year with a carry forward surplus and other funding that was \$0.4 million lower than budget. Funds have been carried forward against large capital expenses anticipated to occur in 2005/2006.

3.3 Performance Measures

Under the terms of Schedule K of the OMAFRA-University of Guelph Partnership Agreement, the Laboratory Services Division (LS) is expected to provide OMAFRA with laboratory services that address OMAFRA's program needs. The OMAFRA program managers define the quantity and type of testing to be done for the regulatory programs. Each year the respective program manager provides LS with a sampling plan. The sampling plan varies from year to year. Since the disease surveillance program is based on a passive system, the actual number of tests is not defined but a target volume has been established. A primary measure of performance under the agreement is the ability of LS to deliver the required volume and type of tests specified in the timeframes required.

The AHL performed approximately 586,000 procedures under the passive disease surveillance program. Veterinarians who use the OMAFRA supported service were surveyed and 100% of the respondents rated the service as satisfactory or better.

The LS also carried out the scheduled testing programs described under the performance management agreements for plants, soil and water and for food. A total of approximately 970,000 tests were performed. The program managers who use the testing service were surveyed and 100% rated the service as satisfactory or better.

There is an expectation that LS will generate sufficient income to finance infrastructure upgrades that support technological improvements in the testing services. The actual amount that is available for reinvestment depends upon the economic environment and opportunity to attract revenue-generating projects as well as the ability of Lab Services to manage costs. A target for reinvestment was set at \$1.7 million and the actual was \$1.5 million.

There is an expectation that LS will demonstrate the ability to modify capabilities as needs and technology change. There is a growing need for individual test methods to be accredited to the ISO 17025 standard in order for the results derived from those methods to be accepted internationally. In order to meet this new requirement, LS began a program in the previous year to expand the scope of its accreditation. In 2004/05 the scope of accreditation was expanded by 46 test methods. In addition, LS became licensed for water testing and became the first non-government laboratory accredited for method development and non-routine testing. The list of accredited methods is extensive and can be found on the web sites of the accrediting bodies, namely, the Standards Council of Canada and the Canadian Association for Environmental Analytical Laboratories. These improvements will ensure that test results produced by LS will be recognized internationally. LS also has an ongoing program to validate and introduce new methods as technology and client needs change.

3.4 Reinvestment (\$'000's)

The table below details key reinvestments made in 2004/05. A detailed inventory of equipment including all new acquisitions is submitted to OMAFRA on a yearly basis. Major acquisitions are noted in the table.

Reinvestment Item	Amount <i>(in million's of dollars)</i>
Phone system 95 Stone Rd	0.4
Dairy sample system	0.2
Sensititre	0.1
Basement renovations – 95 Stone Rd	0.1
Method development	0.1
LIMS system (AHL)	0.1
Isoplator	0.1
PC replacement	0.1
Real-time PCR system	0.1
Other (less than \$70,000)	0.2
Total	\$1.5

3.5 Improvement Projects

As part of a long-term plan for improving effectiveness, LS carried out a number of projects aimed at improving processes. The goals for these projects are to improve the use of resources while maintaining a high quality service at a reasonable cost. Business improvement projects are part of Laboratory Services' long-term strategy for continuous improvement and cost containment.

The automated sample and data handling system for the raw milk quality and composition program was upgraded across the province in November. This implementation was the culmination of a multi-year effort. The new system allows data collected electronically at the farm to be transferred through the Dairy Farmers of Ontario computer system to the Sapphire laboratory information system. The computer determines the testing requirements against a set of business rules. Once tests are performed the computer sends test results back to the Dairy Farmers of Ontario system for rapid distribution back to the farm. A robotic scanner will be installed in early 2005/06 to further automate the process. On a yearly basis, the system will track approximately 1 million samples and approximately 1.5 million test results. The benefits of the new program include improved information for investigation, enhanced integrity and improved flexibility to introduce new programs. The new system was designed and implemented in partnership with the Dairy Farmers of Ontario, the Ontario Dairy Council, the Ontario Milk Transporters Association, OMAFRA and the Laboratory Services Division. Reinvestment funds generated from laboratory revenue were used to fund the project resources and laboratory upgrades. The costs for this project are in excess of \$450,000, not including staff time. This represents a significant reinvestment into the raw milk program.

During 2004/05, LS had planned to improve access to the disease surveillance information contained in the veterinary laboratory computer system. The plan involved creating a separate database and migrating the historical information from the laboratory system. The project proved to be more difficult than anticipated due to technical issues with the lab information system. LS decided to proceed with an upgrade or replacement for the laboratory information system rather than work on the separate database as an interim step. The AHL LIMS project was initiated. Specifications were developed for a new system and an RFP was issued. By the fiscal year end the responses to the RFP

were under evaluation. The new laboratory information system will be financed through reinvestment funds that were set-aside in 2003/04. The project costs are estimated at approximately \$1 million. This is a major upgrade that will enhance both the existing disease surveillance program and the AHL's ability to respond to an outbreak.

During 2004/05, there was an emphasis on emergency preparedness. LS participated in planning meetings with other public sector laboratories in Ontario, participated in an outbreak simulation and joined the Ontario Analytical Laboratory Council (ALC). As part of the emergency preparedness, LS developed plans for both disaster recovery and for emergency response. The former refers to a plan to mitigate the impact of a disaster on laboratory operations. The latter refers to a plan that would allow LS to fulfill its obligations to OMAFRA in the event of a disaster that required laboratory testing.

3.6 Accommodation and Planned Upgrades

There has been no further space planning associated with the proposal to build a shared facility for AHL and the Department of Pathobiology. We continue to be concerned about biosecurity in the current facility and the lack of suitable space to accommodate testing in an emergency. As an interim measure the AHL began a review of biosafety practices and began working with the Department of Pathobiology to look at process improvements to limit the potential for exposure in the post mortem area.

The laboratory space was expanded at 95 Stone Rd with the renovation of the basement area to create approximately 2,100 sq ft of dry laboratory workspace. The space was required to accommodate an expanded testing program for plum pox virus. The cost of the renovation was approximately \$123,000 and was financed through reinvestment funds.

There has been a long-standing problem with the HVAC system at 95 Stone Road. Assessments of the problem were done in 2004/05 and planning for repairs to the system was done but the actual construction did not take place. The project is being financed through the capital allocation plan and is being managed by the Ontario Realty Corp. This is a significant project that will require planning to allow the laboratory to continue in operation during the construction.

The phone system at 95 Stone Road was upgraded in order to improve communications with clients and in order to be compatible with the University of Guelph communications systems. This represents a basic infrastructure upgrade. The cost of approximately \$368,000 was financed by Laboratory Services.

3.7 Quality Assurance

Laboratory Services maintained ISO accreditation to the 9001:2000 standard and expanded the scope of testing that is accredited to the ISO 17025 standard. Forty-six new tests were added to the scope of accreditation. In addition, Laboratory Services became the only non-government laboratory to be accredited for test method development and non-routine testing. The water lab that was created in the previous year became licensed for water testing. The GLP status of the pesticide laboratory was confirmed.

The Animal Health Laboratory was audited by the American Association of Veterinary Laboratory Diagnosticians. Accreditation for full service was confirmed for 5 years. This accreditation is additional to the ISO status mentioned above.

3.8 Research Activities & Innovation

3.8.1 Research

While Laboratory Services is not a research unit, it does carry out method development and surveillance studies. Most of these are financed through income earned by LS through the sale of various services. During 2004/05, external funding was obtained to support the following projects:

Funding Agency/Amount	Subject	Investigator(s)
Health Canada \$100,000 (2 yrs)	Identify risk factors for contamination of food by <i>Mycobacterium avium subspecies paratuberculosis</i>	Joseph Odumeru
Dairy Farmers of Ontario \$165,000 (2 yrs)	Identify risk factors for on farm transmission and contamination by <i>M. paratuberculosis</i>	Joseph Odumeru
Ontario Ministry of Agriculture, Food and Rural Affairs \$55,000 (2 yrs)	Novel tools for identifying risk of contamination of foods and environments by <i>M. paratuberculosis</i>	Joseph Odumeru
Becton Dickinson \$12,000	Evaluation of BBL Chromagar for selective isolation of <i>Listeria monocytogenes</i> in foods	Joseph Odumeru
Ian Barker \$20,000	Development of real time PCR tests to identify Canine parvovirus-2 and Canine distemper viruses	Susy Carman, Hugh Cai, Ian Barker, Grant Maxie
Ontario Ministry of Agriculture, Food and Rural Affairs \$79,994 (2 yrs)	Novel protein microarray assay for <i>Salmonella</i> serotyping	Shu Chen, Hugh Cai, Anne Muckle
Ontario Ministry of Agriculture, Food and Rural Affairs (continuation from 2003)	DNA preparation method for simultaneous detection of multiple pathogens in food by microarray-based assay	Shu Chen, Joseph Odumeru

In addition to the above Dr Odumeru continues to work with Dr Lucy Mutharia at the Dept of Microbiology at University of Guelph on the detection of *Mycobacterium paratuberculosis* in milk and environment samples.

3.8.2 Innovation

The Laboratory Services Division is a service organization that provides laboratory services; as such, innovation for LS means improving processes (see 3.5 above) and developing new testing methods.

3.8.3 New Capabilities

The Laboratory Services Division is continually updating and developing new testing methods to meet the emerging needs of OMAFRA and other clients. The following new methods were introduced during 2004/05

New Microbiological Test Requested by OMAFRA

Detection of *Aeromonas* in sprouts and spent irrigation water
Detection and enumeration of *E. coli* 0157:H7 in sprouts and spent irrigation water.
Salmonella enumeration in sprouts seed, fruit and vegetables.
Enumeration of *Salmonella* species in wastewater by MPN method
Enumeration of *Yersinia* species in wastewater by MPN method
Enumeration of *Campylobacter* species in wastewater by MPN method
Enumeration of *Listeria* species in wastewater by MPN method
Enumeration of *E. coli* in wastewater by MPN method

New Microbiological Tests set up by Lab Services for service work

Detection of *E. coli* 0157:H7 in foods and environmental samples by immunomagnetic separation (IMS) technique.
Enumeration of *E. coli* 0157:H7 in foods
Detection of *Salmonella* species in foods and environmental samples by immunomagnetic separation (IMS) technique
Detection of *Listeria monocytogenes* in foods by immunomagnetic separation (IMS) technique
Use of Chromogenic media for selective detection of *Listeria monocytogenes* in food and environmental samples.
Detection of Salmonella DT104 in environmental samples by PCR and antibiotic resistance patterns.

New Tests in Molecular Biology

Detection of *Cryptosporidium parvum* and *Giardia intestinalis* in Wastewater Samples
Genetic Analysis of the Mutation in the Swine IGF2 Gene
Detection of Residual Bovine, Ruminant, Porcine and Animal DNA in Feed Samples
PCR Detection of GMO in Soybean and Soybean Products

New food animal tests introduced by the AHL in fiscal 2004-2005

Bacterial counts, bedding
Beta-lactamase
Brachyspira PCR profile
BSE ELISA
BVDV (type 1b, TGAC) VN
BVDV PCR/RFLP alpaca
Cushing's syndrome screen
CWD ELISA
Equine influenza virus PCR
ILTV AGID
IHC – WNV – monoclonal
Insulin
Insulin/glucose ratio
Mycoplasma bovis RT-PCR
PRRSV IgM indirect FA-N Am strain
PRRSV RT-PCR/RFLP (609bp)
PRRSV RT-PCR tissue
Scrapie ELISA
Swine influenza (H3N2) ELISA
Swine influenza (H1N1- NC) HI

3.9 Services Provided to OMAFRA

3.9.1 Food Industry Division Programs

The testing services provided by Laboratory Services support the provincial Milk Act, Meat Inspection Act, Farm Products Grades and Sales Act and the Food Safety and Quality Act, 2001. The volume and type of testing is determined by the appropriate OMAFRA program manager. The tests vary in complexity from a milk fat analysis to a broad-based pesticide residue screen. Approximately 970,000 tests were performed in support of the food safety programs. There were a number of changes to the testing programs for the Food Industry Division including some one-time projects and several ongoing changes during the year as the OMAFRA program managers adjusted their testing programs to meet new challenges. This required redistribution of laboratory resources throughout the year.

LS supported a large investigation on finished dairy products that allowed OMAFRA to determine future needs for the regulatory programs. The results of the study led to a change in the protocols for microbiological testing.

There was a trend towards increased microbiological testing with less testing for chemical residues. Many of the in-year changes related to this shift in requirements. A number of new microbiology tests were set up to accommodate the new requirements.

3.9.2 Agriculture and Rural Division and Federal-Provincial Agreements

Laboratory Services provides support for plant diagnostics and soil mapping, as well as environmental testing in support of the Great Lakes initiative. The volume of testing depends upon OMAFRA or Ministry of the Environment program activities. LS tested 575 samples under these programs.

3.9.3 Livestock Technology Branch

Laboratory Services supports the disease surveillance activities of Livestock Technology through the Animal Health Laboratory (AHL). AHL provides a full range of diagnostic services to veterinarians who support the poultry and livestock industry. AHL's main activity is to provide accessible, highly reliable, and cost-effective diagnostic testing that includes a broad scope of tests. Data generated as a result of the diagnostic testing are made available to the Veterinary Science group within OMAFRA for the purposes of analyzing trends and identifying emerging diseases or urgent issues. AHL also supports the federal Health of Animals Act as a primary source of information on reportable diseases.

During 2004/05, the AHL processed 34,227 cases under the disease surveillance program. The lab completed approximately 586,000 technical procedures under the OMAFRA supported programs. This includes testing done in support of the Ontario Hatchery and Supply Flock Policy (OHSFP) and the Ontario Swine Health Information Program (OSHIP). In addition, the AHL supported a number of short-term studies and surveys including chronic wasting disease in elk, and follow up investigations such as the investigation of laryngotracheitis (ILT). These studies were funded under separate agreements.

Under a separate agreement with OMAFRA, the AHL converted the existing BSE testing procedures to a rapid BioRad method based on ELISA technology and obtained CFIA accreditation to perform this BSE screening procedure. The immunohistochemistry method and the previous program that was funded by OMAFRA was discontinued in anticipation of a new program being funded by CFIA. The CFIA decided to do the BSE screening test in their own facilities for the duration of their fiscal year.

We continue to work with the CFIA in hopes that the testing can be done at the AHL.

The AHL continued to develop molecular-based testing procedures (PCR) for the rapid assessment of microbial diseases.

The AHL participated in the simulation of an avian influenza outbreak as part of its planning for emergency response. The exercise included a review of communication systems and systems for handling biologically hazardous material. The AHL initiated a project to review the handling of biohazardous material and to develop biocontainment strategies in concert with the Department of Pathobiology of the Ontario Veterinary College.

3.9.4 Related Provincial Programs Not Covered by the Agreement

The federal government decided to initiate a second phase of the plum pox eradication program. Lab Services was engaged to provide the testing for the program in 2004/05 and signed an agreement with Agricorp to provide the testing for an additional two years. The testing is in support of the Ontario stone fruit industry.

The Canadian Food Inspection Agency put forward a proposal for funding to the Clinical Research Training Institute (CRTI) to develop a Canadian Animal Health Surveillance Network. The proposal has been funded for \$2.3 million for the development of an information network capable of capturing, in real time, diagnostic results from public sector veterinary diagnostic laboratories. It includes the development of diagnostic capacity to investigate foreign animal diseases. The University of Guelph is a partner in the project through the Animal Health Laboratory.

The Ministry of the Environment for Ontario has contracted with the Laboratory Services Division to develop a model for disaster recovery and to explore the potential for mutual back up for pesticide testing. The model could assist the Province of Ontario in planning for an emergency by making use of existing laboratory capacity rather than investing in redundancy. It also improves the ability of the Province of Ontario to plan a coordinated laboratory response to an emergency event.

4. OTHER OMAFRA/U OF G AGREEMENT PERFORMANCE MEASURES

In addition to the primary areas covered by the OMAFRA/U of G Agreement (Research, Diploma Education, Veterinary Clinical Education Program, and Laboratory Services), there are several other Performance Management Agreements (PMAs) that require reporting as part of the Annual Report. The objectives, performance measures and results for these PMAs are itemized below.

Reporting (Finance and Business)

Budget

The University must annually present the budget to OMAFRA for the Research, Diploma Education and Training, Veterinary Clinical Education Program (VCEP) and Laboratory Services programs.

Quarterly Management Reports

The University is to submit financial management reports to OMAFRA within 6 weeks after the end of each quarter for the Research, Diploma Education and Training, Veterinary Clinical Education Program (VCEP) and Laboratory Services programs. In addition, a Transfer Payment report is to be filed each time.

Business Plan

The University is to submit a business plan covering the four programs (Research, Diploma Education, VCEP, Laboratory Services) each year, encompassing a brief description of each program and sub-programs, changes required or anticipated to the program relative to the previous year, new partnerships being or to be developed, staffing changes that could impact on the deliverables under the Agreement, and facility accommodation issues. The University met this deadline in 2004/05 by submitting the draft business plan to OMAFRA on April 15th; after an extension had been granted to accommodate the submission of the budget to the U of G's Board of Governors. An Executive Financial Summary was requested by OMAFRA's Executive Committee to be developed and incorporated into the Business Plan prior to approval. This was completed in early September 2005 and awaits Executive Committee approval.

Trust Funds

The University is to submit reports on the '**Post-Retirement**' and '**Non-Pension Post-Retirement**' trust funds, as well as the '**Agreement Research Trust Fund**' (formerly the 'Partnership Research Trust Fund'), along with the quarterly management reports. The University maintained compliance with this PMA in 2004/05.

Physical Facilities and Assets

This section includes PMA's pertaining to:

- Annual reporting on **space utilization and rationalization**
- Submitting budgets and reporting annually on **operations and maintenance**, and updating of Schedule T as required
- Review of facilities, including annual submission of **facility deficiency reports** and plans for addressing short, medium and long-term deficiencies.
- Reporting **sub-tenancies**, annually
- Submitting annually an **Asset Inventory and Planned Disposition Report**, detailing date of acquisition, asset value, ownership, condition, items sold, traded in or otherwise disposed of and revenues generated; intended dispositions and/or replacements for the coming year, and **livestock inventories**. With the exception of the livestock inventories (which are reported within this Annual Report), each of these entails reporting dates other than with the Annual Report.

Emergency Preparedness / Environmental Health and Safety

Emergency Preparedness Plan (PMA #6 under Physical Facilities and Assets)

The University is expected to maintain the Emergency Preparedness Plan, including provisions for review and update as required.

Health and Safety Management

The University is to maintain a Safety Management System for all locations regarding compliance with relevant legislation, training requirements for all staff and students, record keeping and communication requirement and other health and safety provisions, with a goal of zero lost-time accidents.

Environmental Management

The University is to ensure Environmental Management Plans are in place for all locations covering compliance with relevant legislation, management of incidents, identification of hazards associated with the programs, record keeping and communications, with a goal of zero incidents (spills, contamination, etc.).

The University's Environmental Health and Safety (EHS) department is responsible for the development and implementation of occupational health and safety and environmental protection policies, programs and initiatives. The University's Safety Policy Manual for Risk Management and Due Diligence (at www.uoguelph.ca/HR/ehs) contains all of the institution's safety policies and outlines safety program details. The University promotes the internal responsibility system for workplace safety management and regulatory compliance. EHS provides advice and services in this regard to members of the University community. In particular, front-line managers and supervisors are provided support and guidance for workplace safety performance and due diligence.

The University has an incident reporting policy (i.e. safety policy number 851.04.02 titled Injury and Incident Reporting) and an Emergency Response Plan (ERP). The University's Security Services Department co-ordinates emergency response actions and up-dates the emergency contact lists and response action plans on an on-going basis. All workplaces are required by institutional policies to have fire safety plans and local emergency procedures.

During the period of time covered by this report, there was a heating oil spill at the Centennial House, Elora Research Station, OMAFRA's Facilities Manager and PROFAC managed the cleanup.

Indemnity and Insurance

The University is required to submit certificates of all types of insurance to OMAFRA at the execution of the Agreement and submit renewal certificates as needed. The University has submitted the certificates in compliance with this PMA in 2004/05.

Non-OMAFRA Funding for Infrastructure

Awards were received in 2004/05 for over \$3.68 million in non-OMAFRA funding for research infrastructure related to the OMAFRA research program objectives. A number of these funding awards were combined CFI (Canadian Foundation for Innovation), OIT (Ontario Innovation Trust) awards and matching contributions.

Description of Award	Sponsor(s)	\$ Amount
Infrastructure for the investigation of sickness behavior in animals (S. Millman, Population Medicine)	CFI/OIT/matching	\$158 K
An integrated setup for the metabolic profiling of wine lactic acid bacteria and yeast and the bio-chemical grape and wine characterization (R. Mira de Orduna, Food Science)	CFI/OIT/matching	\$412 K
Comparative proteomics of yeast fermentations (G. van der Merwe, Microbiology)	CFI/OIT/matching	\$312 K
Cryptosystems Security Research Laboratory (R. Muresan, Engineering)	CFI/OIT/matching	\$314 K
Development of tools and technologies for sustainable wastewater reuse (K. Farahbakhsh, Engineering)	CFI/OIT/matching	\$318 K
Ecology, Traceability and Detection of Foodborne Pathogens in Food Production and Processing Chains (K. Warriner, Food Science)	CFI/OIT/matching	\$183 K
Integrated facility for studies on microbial ecology, biogeochemistry and bacterial-mineral interactions in soils and sediments with applications to environmental protection (D. Glaseuer, Land Resource Science)	CFI/OIT/matching	\$623 K
Manipulation of myoblast and fibroblast cell expression by mechanotransduction (P. Purslow, Food Science)	CFI/OIT/matching	\$245 K
Carbohydrate Analysis (M. Monteiro, Chemistry & Biochemistry)	CFI/OIT/matching	\$199 K
Infrastructure for an Integrative Nutritional Sciences and Metabolic Physiology Laboratory: Establishment of a Metabolic Biomarker and Adipokine Facility (L. Robinson, Human Biology)	CFI/OIT/matching	\$292 K
Infrastructure to study the mechanisms regulating nutrient utilization in ruminants (K. Swanson, Animal & Poultry Science)	CFI/OIT/matching	\$312 K
Laboratory for the study of molecular endocrinology and immunology in poultry	CFI/OIT/matching	\$312 K

4.1 Intellectual Property

Research discoveries and results are disseminated in several ways. One way is termed knowledge dissemination, which generally consists of traditional publications in scholarly and industry journals, conferences, seminars, teaching, theme-based bulletins, internet websites, etc. where the goal is to promulgate the findings as broadly as possible, for the general benefit of society at large.

A second form of dissemination is commercialization, which recognizes the economic potential of knowledge. Commercialization relies on intellectual property (“IP”) – research discoveries which are protected in such a fashion to as to become intangible property which has a transferable value. Examples of such forms of IP protection include copyright, patents, plant breeder’s rights, industrial design registrations, trademarks, etc. A trade secret can also be a legitimate form of protection (e.g. the formula for Coca-Cola is a well known example), but it is not compatible with a requirement or imperative to publish full research methodology and results so is a less frequent form of protection in an academic setting.

The typical stages of intellectual property commercialization are research discovery, disclosure, evaluation and prior art search, protection and marketing, then licensing and possibly new company formation. In a number of instances, options are built into research contracts (or negotiated contemporaneously with the research collaboration) such that the marketing phase is abbreviated. In others, the evaluation phase may involve discussions with companies in a particular market segment such that a potential receptor company is identified early on, which can also expedite marketing. More commonly protection precedes marketing and commercial transfer, and to that extent, intellectual property protection is inherently speculative. In no case is a discovery disclosed in enabling form except if first protected by IP filing or under a confidentiality agreement.

Management and Financial:

Germplasm

Germplasm (plant cultivar) management is a partnership between OMAFRA and the University. For plant cultivars, OMAFRA/ARIO acts as an agent for the University of Guelph (the owner of the cultivars) in the payment of eligible costs (if not paid by licensee) and in the collection and distribution of royalties and license fees. For non-germplasm technologies, the University pays costs and collects and distributes licensing revenues. In both instances, the University manages IP protection, if any, and licensing agreement negotiation.

In part this division of responsibilities represents a historical development in that OMAFRA/ARIO once funded 100% of cultivar development and handled commercialization of these – today many of these cultivars are co-developed with other funding. As a result the fiscal period for germplasm activity is based on OMAFRA’s fiscal year end of March 31st, rather than the University’s fiscal year end of April 30th. Royalties are received by OMAFRA and accounting by cultivar is performed by OMAFRA staff during each OMAFRA fiscal year. After the end of such fiscal year, royalty sharing and expenses are jointly agreed upon/reconfirmed by OMAFRA and University staff and payment is made by ARIO to the University for its share of royalties, less expenses. Typically this payment is received after the University has closed its books for the equivalent fiscal year such that on the University’s financial statements net germplasm royalties are recognized one year in arrears.

The following table illustrates the treatment of royalties:

OMAFRA Year	Gross royalties	OMAFRA Share	UofG Share	UofG %	UofG year received
2003	\$344,873	\$239,560	\$105,313	30.5	2004
2004	\$415,074	\$264,332	\$150,742	36.3	2005
2005	\$698,451	\$489,167	\$209,284	30.0	2006

Royalties for both field crops (soy, cereals, canola, maize, forages and white bean) and horticultural crops (apple rootstock, fruit trees, asparagus and strawberries) increased in fiscal 2005 over 2004. Field crop royalties showed the greatest increase, rising to 94.5% of total revenue from 91.7% last year. Of field crops, soybean cultivars royalties increased the most - by 73% to \$449,308 or 64.3% of gross royalties from 56.9% of gross royalties last year, although some of this increase was due to payments received from sales in prior years. The three soybean cultivars with the largest levels of royalties were OAC Bayfield, OAC Erin and OAC Prudence.

Cereals royalties more than doubled to \$112,635 which represents 16.1% of gross royalties. \$91,875 of the cereals royalties were due to a single Ridgetown wheat cultivar, Tribute (VA90W-593). Maize inbred royalties rose to \$59,833 or 8.6% of gross royalties from \$34,934 last year. Horticultural royalties increased overall to \$38,000 from \$34,000, with increases in apple rootstocks, tree fruit and strawberry royalties compensating for decreases in asparagus royalties. Expenses totaled \$2,856 for the year ended March 31, 2005 (OMAFRA share \$1,327) and \$6,240 for the germplasm year ended March 31, 2004 (OMAFRA share \$5,649). The University's percentage share of germplasm royalties decreased in 2005 over 2004 as the largest increase in royalties was due to soybean cultivars with a higher portion of OMAFRA funding.

The University's responsibilities for germplasm are primarily managed by a faculty member in the Plant Agriculture department who is a breeder himself and who spends 25% of his time in this activity. He has been involved in these responsibilities for 4 years.

Non-germplasm:

Non-germplasm intellectual property is managed primarily by full time Business Development Office ("BDO") staff, which had a Director, 3 technology transfer managers, a technology transfer assistant and part time secretarial support at the end of fiscal 2005. Accounting services are provided to the BDO by Research Financial Services, another department in the Office of the Vice President of Research. Information technology support is provided by Research Communications. Royalties paid to OMAFRA on non-germplasm IP for fiscal 2004 amounted to \$119,662; versus costs charged of \$23,475.

Other statistics:

Disclosures:

Disclosures represent the beginning of the intellectual property commercialization pathway (though "marketing pull" to encourage disclosures is often a necessary precursor). Total disclosures for the office and OMAFRA related disclosures are shown in the following table:

Disclosures						
Fiscal year	2005			2004		Fiscal year
	Germplasm	other	total	Germplasm	other	Total
All disclosures	82	24	106	25	19	44
OMAFRA related	82	5	87	25	6	31

Fiscal 2005 (ended March 31st) germplasm disclosures consisted of 16 maize, 46 soybean and 20 alfalfa varieties. In 2004, 16 barley, 1 oat and, 4 wheat and 4 soybean disclosures were made.

Patent Activity and status for University fiscal 2004/05 (ended April 30, 2005)

Applications	Initiated	Follow-on	Total
Total	10	24	34
OMAFRA related	3	19	22

Issued in year	Canada	US	Other	Total
Total	0	4	3	7
OMAFRA related	0	2	2	4
EOYr Issued Patents				
Total	10	39	43	92
OMAFRA related	3	13	30	46
Issued Pats. Licensed				
Total	8	27	33	68
OMAFRA related	3	11	25	39

It should be noted that not all patents are licensed but the percentage of issued patents licenses is a measure of marketing success as it may take 3 to 5 years between original filing and final issuance. Comparable statistics are found in the recently released Statistics Canada Report Survey of Intellectual Property Commercialization in the Higher Education Sector, 2003. On average these the percentage of issued patents at year end that were licensed was 35% for Canadian issued patents, 30% for issued US patents and for other patents was 45%. U of G compares vary favorably to these figures. The University has licensed a substantial portion of its issued patent portfolio (84% of the OMAFRA issued portfolio and 73% of the overall issued portfolio). One application for plant breeder's rights was filed during the germplasm fiscal year ended March 31st.

New License Activity:

Germplasm:

Thirty four germplasm licenses were signed in the year. There were 24 exclusive and 1 non-exclusive licenses signed with Canadian companies. There were 2 exclusive and 6 non-exclusive licenses signed with foreign companies. Only one of the exclusive licenses, to a Canadian company, arose as the result of a sponsored research contract.

Non-germplasm:

Two exclusive licenses were signed that pertain to OMAFRA funded technologies. Both were to foreign companies, one to a small US with which the inventor is now affiliated, and one to a Mexican company with international operations. One OMAFRA funded technology non-exclusive license was signed with an Australian company. One research collaboration during the year was negotiated to develop a partly OMAFRA funded technology. This 4 party agreement contains several research licenses and an option to a Canadian company for a worldwide commercial license for two fields of use.

4.2 IP Protection and Status

The University seeks to maximize and balance benefits to researchers, the institution, business, and society by developing and licensing technology so it reaches practical application in the marketplace. The researchers benefit by contributing to a commercial solution as well as by sharing in net income under the inventions policy. The institution, and for many technologies its partner OMAFRA benefits by contributing to a solution, and under the inventions policy is creating a self sustaining pool of funds to support additional technology development and/or applied research. Business benefits as it receives the bulk of any profits and more that one business may license a particular technology depending on a company's geographic reach. The University seeks receptors both near and far and encourages export sales by receptors by permitting sublicensing and distributorships on terms that it approves. As it is not uncommon for a company's reach to exceed its grasp the University generally requires licensees to fund patent costs during the term of the license for the geographic areas in which sales are expected and has recently been incorporating provisions that require periodic reviews of penetration in diverse geographic markets and possible reversion to the University (for re-licensing) of territories for which a market presence has not been established. In this way the University encourages exploitation of markets near (local investment) and far (export revenue). The University is mindful that it, as an academic institution, and Canada, as a developed country, must take a broad view of benefits to society and also consider research on and technologies that might benefit developing countries.

The germplasm portfolio consists of more than 1,700 varieties which are either licensed or used for further breeding. New varieties frequently supplant older ones, but back crosses and inbreeding can be beneficial. Protection of germplasm is largely achieved by limiting distribution and usage via either licenses or material transfer agreements (a specialized form of license). Plant Breeders' Rights are sometimes filed, but rarely. Revenue was received on approximately 150 varieties in 2005, the disclosures on which ranged from 1988 to 2004.

The rest of the IP portfolio is largely protected via patents which are licensed to a variety of companies. Occasionally unpatented technologies may be licensed as trade secrets (typically methods that would be difficult to enforce if published) or under material transfer agreements/licenses for use in countries where there is no patent that prohibits sale (may be patented in other countries). The status of these other technologies which OMAFRA has supported in whole or part (~33% of the rest of the University' portfolio) is as follows:

Tech ID	Title	Tech Status
Baird 20011109	JEB diagnostic test for Belgian horses	Licensed - Non-Exclusive
Bienzle20050331	A test to direct erythropoietin treatment of horses	Patenting
Bettger 20031010	Cow's milk fortified with nervonic acid by natural in vivo fortification	Marketing
Bettger 20040218	Nervonic acid consumption	Needs further research
Buhr 19980406	Reduction of Sperm Sensitivity to chilling/freezing	research collab to develop w/ option

Tech ID	Title	Tech Status
Carman 20010628-2	Cytopathic Type 2 Bovine Viral Diarrhea Virus (BVDV) Strain 53637	Licensed - Non-Exclusive (one-time fee)
Derbyshire 19890502	Recombinant fowlpox virus (rFPV) and Recombinant baculovirus (rBV) expressing the HN gene of Newcastle disease virus	MTA with company
Deveau 20020426	Injection-Port Chamber for the Single-Barrel Silanization of Multibarrel Ion-Selective Microelectrodes	Licensed - Exclusive to OCE
Dixon 20030526	Hypobaric plant growth chambers for plant studies under reduced atmosphere and variable pressure	Licensed - Exclusive to OCE
Duitschaeffer 19911128	Acidophilus/ Bifidus Milk Products	closed subsequent to year end
Erickson 20010524	Novel Inducible Genes from Alfalfa and Methods of Use Thereof	Licensed non-exclusive
Etches 19970425	Production of Human Immunoglobulins in Chicken Eggs	Licensed - exclusive
Forsberg 19990526	Transgenic animals expressing salivary phytase	In regulatory approval process, option and marketing
Holub 19960430	Custom Feed Supplement to Maximize Omega-3 Fatty Acids in Cow's Milk	Licensed - Exclusive with right to sub-license
Holub 19980622	Garlic Processing Technique	Licensed - Exclusive
Kasha 19980429	Embryogenesis and Plant Regeneration from Microspores	Option expired, re-marketing
Mallard 079981	Method of identifying high immune response periparturient animals	Licensed - Exclusive
McGurrin 20040402	Pressure and ultrasound-guided cardiac catheter for transvenous electrical cardiodiversion of equine supra-ventricular cardiac arrhythmias	License being negotiated
Mckersie 19870324	Process to induce desiccation tolerance in somatic embryos	Licensed
Mckersie 19971215	Enhanced Root Production in Transgenic Perennial Plants	Option expired, re-marketing
Nagy 20000817	Porcine Adenovirus Based Vector, Vaccine	Option

Tech ID	Title	Tech Status
Nagy 20030530	Fowl Adenovirus (FAdV) based vaccine for Poultry; FAdV based expression vector for Gene Delivery	Licensed - Exclusive with right to sub-license
O'Brien 19900111	Diagnosis for Porcine Malignant Hyperthermia	Licensed - Non-Exclusive to many companies
Paliyath 19980831	Inhibition of Phospholipase D activity by C6 Aldehydes and Alcohols	Licensed - Exclusive
Paliyath 20000517	Development of a Novel Antioxidant Formulation to Control Superficial Scald in Apples	Licensed - Exclusive
Pauls 20040630	Bean phenylpropanoid microarray	Evaluation
Plante 20000810	Porcine Embryo Production, Recovery, Maintenance and Transfer Systems for Use in Domestic and International Genetic Transport and the Elimination of Environmental Pathogens in Swine.	Licensed - Non-Exclusive
Prescott20041004	Rhodococcus equi vaccine	Testing
Saxena 19981216	Micropropagation technologies for phytopharmaceutical: St. John's Wort	Option associated with company research contract
Shewen 19850207	Vaccine for Prevention of Pasteurella haemolytica pneumonia in Cattle.	Licensed - Exclusive
Shewen 20040604	Edible vaccine	Option associated with company research contract
Squires 19961016	Method for Identifying Pigs with Genetically Reduced Levels of Boar Taint Steroids	Option
Squires 19971128	Genetic Markers for Pigs with Low Skatole (P450IIE)	Option
Squires 19990921	Identification of Metabolites and Key Enzymes in Skatole Metabolism in Liver	Option
Squires 20030825	Genetic Marker for Boar Taint in Sulphur Transferase	Option

5. FINANCIAL SUMMARY

5.1 Introduction:

Some key changes in the presentation of the financial results of the OMAFRA Agreement have been incorporated into the 2004/05 Annual Report. As requested by OMAFRA, the data have been presented as 'Fully Allocated Costs' for each of the programs as well as the Research and Diploma Education sub-programs. In this presentation format, the 'indirect costs' (such as operating research stations and providing student support services, administrative services such as budget management and human resources functions, and physical plant infrastructure) have been allocated to each individual program and sub-program using a consistent methodology to arrive at the reported 'Fully Allocated Cost by Program/Sub-program'. (In the past, the indirect costs were shown as 'Infrastructure & Support' costs in the tables showing the program and overall Agreement costs).

Consequently, the 2004/05 Annual Report includes tabular presentation of the **Fully Allocated Costs** for:

- The overall Agreement, broken down by Program area, including graphic presentation of this data (Figure 2.)
- The Research Program, broken down by sub-program area (Animals, Plants, etc.) (Table 5.2.)
- The Education Program, including the Diploma Program broken down by sub-program area (Agriculture, Horticulture, etc.) and Continuing Education / Business Development and Training Costs (Table 5.3.)
- The Laboratory Services Program broken down by major expense categories (Table 5.4.)
- The VCEP Program with details of expenditures by program objective. (Table 2.5.1.)

This Fully Allocated Costs presentation format provides a much more informative arrangement of the financial data, and is not subject to the same problems in interpretation of program costs as in previous years' presentations. Nevertheless, it is not advisable to use these data for making decisions about incremental allocations/reductions in budget, since such decisions may have variable impact on the direct versus indirect cost bases. For example, reducing 'Animal Research sub-program' expenditures may have less impact than intended, unless the continuing cost of operating the research stations on which the Animal Program is built is also part of the decision process).

In order to provide a direct comparison from 2003/04 to 2004/05 fiscal years, the 'Direct Costs' data for each sub-program within the Research and Diploma Education programs is presented in the format consistent with previous years' reports (since the Fully Allocated Costs model was not used for summarizing the 2003/04 fiscal period).

Table 5.1: OMAFRA Program Summary - 2004/2005 Fully Allocated ¹⁾ Expenditures and Revenues by Program and Location (in thousands of dollars)

Program Area	Alfred '04/'05	Kemptville '04/'05	Ridgetown '04/'05	Lab Services Div. '04/'05	Guelph ¹⁾ '04/'05	TOTAL '04/'05
Research						
Total Expenses	183	2,488	2,761	-	27,614	33,046
Revenues	(31)	(407)	(110)	-	(2,659)	(3,207)
Net Expenses	152	2,081	2,651	-	24,955	29,839
Diploma Education						
Total Expenses	2,266	2,872	3,956	-	299	9,393
Revenues	(481)	(1,987)	(2,586)	-	(267)	(5,321)
Net Expenses	1,785	885	1,370	-	33	4,072
Continuing Ed. / Bus/ dev. & Training						
Total Expenses	1,138	2,763	2,127	-	-	6,028
Revenues	(762)	(2,019)	(2,226)	-	-	(5,007)
Net Expenses	376	744	(99)	-	-	1,021
Veterinary Clinical Education Program (VCEP)						
Total Expenses	-	-	-	-	4,788	4,788
Revenues	-	-	-	-	4	4
Net Expenses	-	-	-	-	4,792	4,792
Laboratory Services						
Total Expenses	-	-	-	19,128	-	19,128
Revenues	-	-	-	(9,120)	-	(9,120)
Net Expenses	-	-	-	10,008	-	10,008
Total - All Programs, excluding Minor Capital Repair Fund						
Total Expenses	3,587	8,123	8,844	19,128	32,701	72,383
Revenues	(1,274)	(4,413)	(4,923)	(9,120)	(2,921)	(22,651)
Net Expenses	2,313	3,710	3,921	10,008	29,780	49,733
OMAFRA Minor Capital Repair Fund 2)						
Total Expenses	48	419	164	-	1,357	1,987
Revenues	(69)	(418)	(164)	-	(1,528)	(2,179)
Net Expenses	(21)	1	-	-	(172)	(191)
Total - All Programs, including Minor Capital Repair Fund						
Total Expenses	3,635	8,542	9,008	19,128	34,058	74,370
Revenues	(1,343)	(4,831)	(5,086)	(9,120)	(4,450)	(24,829)
Net Expenses	2,292	3,711	3,921	10,008	29,608	49,541
Allocated Service Costs	43	98	122	272	5,875	
Total Alloc. Serv. Costs*					(6,410)	
Direct Expenses	2,249	3,613	3,799	9,736	30,143	49,541

1) Program Service Costs and Institutional Infrastructure and Support costs have been allocated to each of the sub-programs to demonstrate the 'all-in' ('Fully Allocated') costs of each program.

2) As of year end a few OMAFRA Minor Capital projects had not had funds fully expended due to later delivery and vendor invoicing of the goods and/or services. All of these projects were fully expended in the first few months of 2005/06, bringing the net expenses for the Minor Capital program to 0 (at each location and overall).

* A portion of the Agreement Service Costs (\$6,410 total) have been allocated to each location as part of the fully allocated costs methodology. This allocation is the difference between the fully allocated net expenses by location as reported in Table #5.1 and the net direct expenses by location.

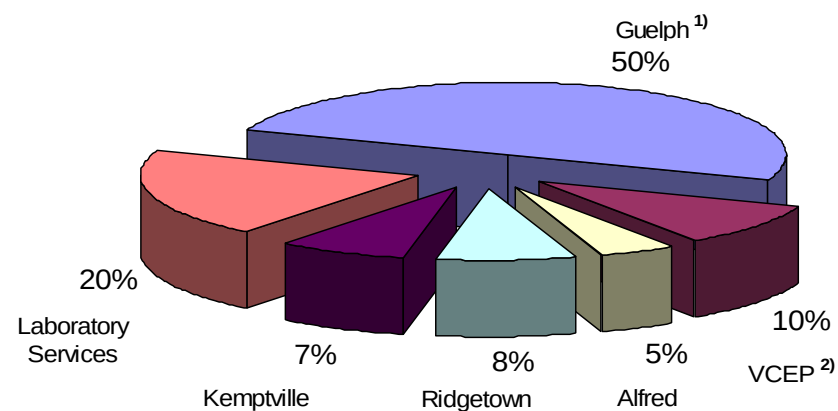
Distribution of Transfer Payment 2004/2005

This presentation shows the net actual expenditures (i.e., total expenses less revenues) of OMAFRA transfer funds, by location for 2004/05. The values presented reflect any carry-forwards of unspent funds from fiscal 2003/04.

The actual transfer of funds under the OMAFRA University of Guelph agreement was \$50.5 million in 2004/05. The total net expenditure for 2004/05 was \$49.7 million. (Refer to Table 5.1). Any unspent Agreement funds are accounted for at the end of the fiscal year and carried forward to the following year's approval budget.

Figure 1. Distribution of Transfer Payment 2004/2005 by Location (Fully Allocated Expenditures

Location	<u>2003/2004</u> <u>Program Costs</u>		<u>2004 / 2005</u> <u>Program Costs</u>	
	\$ (millions)	%	\$ (millions)	%
Guelph ⁽¹⁾	28.4	56%	25.0	50%
VCEP ⁽²⁾	4.7	9%	4.8	10%
Alfred	2.2	4%	2.3	5%
Ridgetown	3.7	7%	3.9	8%
Kemptville, New Liskeard	3.5	7%	3.7	7%
Laboratory Services	7.9	16%	10.0	20%
Total:	50.4	100%	49.7	100%



⁽¹⁾ Includes expenditures for research stations at Arkell, Elora, Ponsonby, Woodstock and Guelph Turfgrass Institute, former HRIO locations (Vineland, Simcoe, Bradford) and all Guelph campus research and diploma education activities.

⁽²⁾ Veterinary Clinical Education Program

Note: These Figures exclude Minor Capital Repair Fund.

Figure 2: Fully Allocated Expenditures by Program - 2004 / 2005

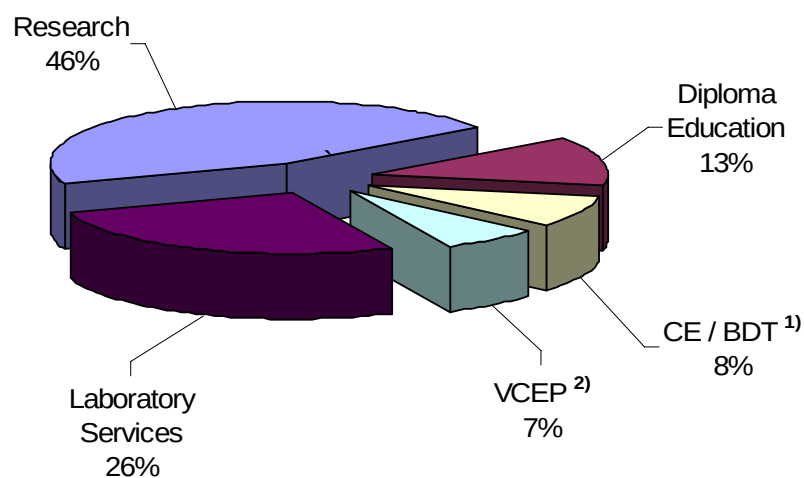
Program	2004 / 2005		2004 / 2005	
	Gross Expenses \$ (millions)	%	Net Expenses \$ (millions)	%
Research	33.0	46%	29.8	60%
Diploma Education	9.4	13%	4.1	8%
CE / BDT ¹⁾	6.0	8%	1.0	2%
VCEP ²⁾	4.8	7%	4.8	10%
Laboratory Services	19.1	26%	10.0	20%
Total:	72.4	100%	49.7	100%

¹⁾ Continuing Education / Business Development and Training

²⁾ Veterinary Clinical Education Program

Note: These Figures exclude Minor Capital Repair Fund.

**Total OMAFRA / U of G Program Expenditures (Fully Allocated)
by Program - 2004 / 2005**



**Distribution of OMAFRA Transfer Payment by Program -
2004 / 2005**

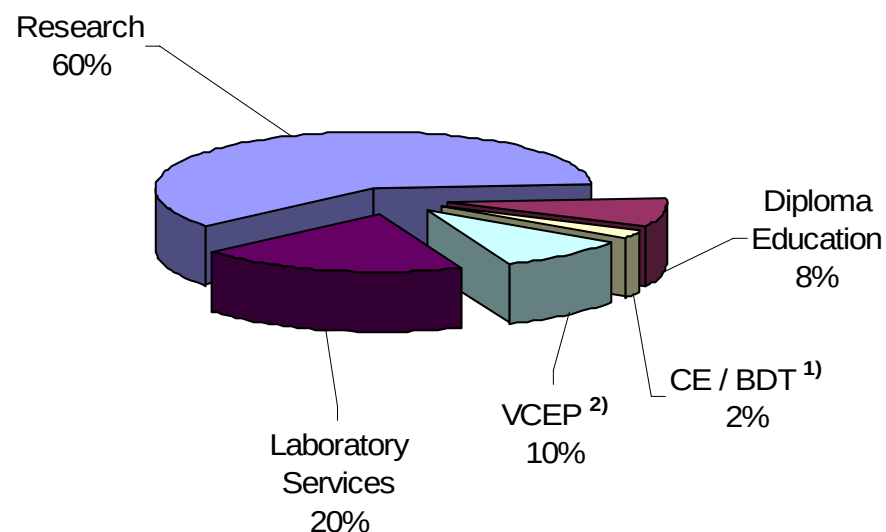
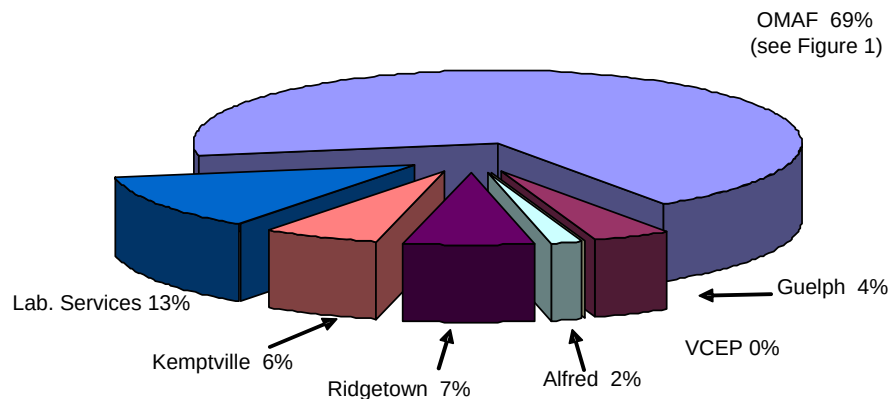


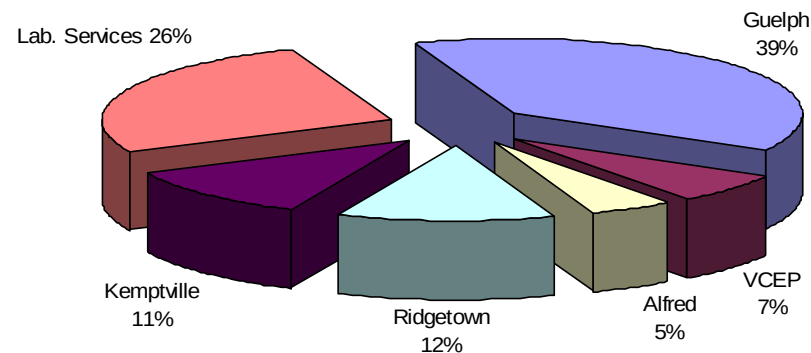
Figure 3: OMAFRA Agreement Total Expenditures and Revenues - Fully Allocated

Location	Fiscal 2004 / 2005				Fiscal 2003 / 2004			
	Expenditures \$ (millions)	%	Revenues \$ (millions)	%	Expenditures \$ (millions)	%	Revenues \$ (millions)	%
OMAFRA Agreement			49.7	69%			50.4	67%
Guelph 1)	27.9	39%	2.9	4%	31.9	42%	3.4	5%
VCEP 2)	4.8	7%	0.0	0%	4.7	6%	0.0	0%
Alfred	3.6	5%	1.3	2%	3.5	5%	1.3	2%
Ridgetown	8.8	12%	4.9	7%	8.6	11%	4.9	7%
Kemptville	8.1	11%	4.4	6%	7.8	10%	4.2	6%
Lab. Services	19.1	26%	9.1	13%	18.8	25%	11.0	15%
Total:	72.4	100%	72.4	100%	75.3	100%	75.3	100%

**OMAFRA Contract: 2004/2005
GROSS REVENUES**



**OMAFRA Contract: 2004/2005
GROSS EXPENDITURES**



⁽¹⁾ Includes expenditures for research stations, former HRIO locations (Vineland, Simcoe, Bradford) and all Guelph campus research and diploma education activities. HRIO operations were included with Guelph operations beginning May 2002

⁽²⁾ Veterinary Clinical Education Program

Note: These Figures exclude Minor Capital Repair Fund.

Table 5.2: 2004/2005 Fully Allocated * Research Expenditures (in thousands of dollars)

	Alfred		Kemptville		Ridgetown		Guelph ¹⁾		TOTAL	
	<i>Gross Expenses</i>	Net Expenses (OMAFRA Transfer Payment)	<i>Gross Expenses</i>	Net Expenses (OMAFRA Transfer Payment)	<i>Gross Expenses</i>	Net Expenses (OMAFRA Transfer Payment)	<i>Gross Expenses</i>	Net Expenses (OMAFRA Transfer Payment)	<i>Gross Expenses</i>	Net Expenses (OMAFRA Transfer Payment)
Plants	-	-	795	741	1,733	1,664	8,290	8,264	10,818	10,669
Animals	-	-	1,373	1,028	175	168	14,474	11,842	16,022	13,038
Food	-	-	59	58	-	-	1,735	1,735	1,794	1,794
RME ²⁾	183	152	261	253	833	800	2,777	2,777	4,054	3,983
SRC ³⁾	-	-	-	-	19	19	338	338	358	357
Total Expenditures (fully allocated)	183	152	2,488	2,081	2,761	2,651	27,614	24,955	33,046	29,839

¹⁾ Guelph figures include combined Guelph, Vineland, Simcoe and Bradford

²⁾ Resources Management and Environment

³⁾ Sustainable Rural Communities

* Research program Service Costs and Institutional Infrastructure and Support costs have been allocated to each of the sub-programs, to demonstrate the 'all-in' ('Fully Allocated') costs of each subprogram.

Table 5.3: 2004/2005 Fully Allocated * Diploma and Continuing Education Program Expenditures (in thousands of dollars)

	Alfred		Kemptville		Ridgetown		Guelph		TOTAL	
	<i>Gross Expenses</i>	<i>Net Expenses (OMAFRA Transfer Payment)</i>	<i>Gross Expenses</i>	<i>Net Expenses (OMAFRA Transfer Payment)</i>	<i>Gross Expenses</i>	<i>Net Expenses (OMAFRA Transfer Payment)</i>	<i>Gross Expenses</i>	<i>Net Expenses (OMAFRA Transfer Payment)</i>	<i>Gross Expenses</i>	<i>Net Expenses (OMAFRA Transfer Payment)</i>
Agriculture	1,282	1,110	1,889	404	1,242	206	1	(0)	4,414	1,720
Horticulture	-	-	163	110	708	421	0	0	871	531
Food & Nutrition	358	310	820	372	-	-	-	-	1,178	682
Vet. Tech.	626	365	-	-	1,450	506	-	-	2,076	871
Env'l. Mgmt.	-	-	-	-	556	237	-	-	556	237
Turf Mgmt.	-	-	-	-	-	-	298	33	298	33
Total Diploma Education Expenditures (fully allocated)	2,266	1,785	2,872	885	3,956	1,370	299	33	9,393	4,072
CE / BDT ¹⁾	1,138	376	2,763	744	2,127	(99)	-	-	6,028	1,021
Total Education (fully allocated)	3,404	2,161	5,635	1,629	6,083	1,270	299	33	15,421	5,093

¹⁾ Continuing Education / Business Development and Training

* Education program Service Costs and Institutional Infrastructure and Support costs have been allocated to each of the sub-programs, to demonstrate the 'all-in' ('Fully Allocated') costs of each subprogram.

Table 5.4: 2004/2005 Fully Allocated * Laboratory Services Division Expenditures (in thousands of dollars)

	AHL		Food Safety & Routine Product, Plant, Soil Analyses		Total	
	<i>Gross Expenses</i>	Net Expenses (OMAFRA Transfer Payment)	<i>Gross Expenses</i>	Net Expenses (OMAFRA Transfer Payment)	<i>Gross Expenses</i>	Net Expenses (OMAFRA Transfer Payment)
Expenditures	7,542	5,056	11,586	4,953	19,128	10,008

Direct Program Expenses (Sch. K base)	9,000
Carry-forward from 03/04	<u>2,441</u>
Sub-total:	11,441
Allocated Service Costs	272
less Year end balance	<u>-1,705</u>
Fully Allocated Costs	10,008

* Laboratory Services L program Service Costs and Institutional Infrastructure and Support costs have been allocated to each of the sub-programs, to demonstrate the 'all-in' ('Fully Allocated') costs of each subprogram.

2004/2005 OMAFRA Minor Capital Program

Early in 2004/05, OMAFRA announced that over two million dollars had been approved for ‘minor capital’ program funding in the areas of animal care and deferred maintenance at the research stations and regional campuses, the first such money in close to 10 years. These funds were targeted specifically to address the most critical facility deficiencies pertaining to animal care, health and safety, and code compliance, along with some crucial purchases of equipment. Except where a project was related to an urgent animal care issue that has been deferred by ORC due to finding limits, projects that fit within ORC’s responsibility or eligibility for funding from the ORC base building capital pool were deferred to ORC / ProFac by OMAFRA.

Using the ‘facility deficiency lists’ submitted by the U of G to OMAFRA as of June 2004, a strategic listing of ‘animal care and deferred maintenance’ priority projects was developed with input from Ministry and U of G station/campus representatives and subsequently approved by senior OMAFRA and U of G management. In addition, a short-list of smaller, ‘quick-turn around’ projects was established that could be funded if there was unspent money near year-end.

After approval-in-principle for the project listing local U of G Managers obtained the requisite quotes/tenders as applicable according to the U of G and Ministry purchasing guidelines, and the recommended quotes were given final approval by Ministry staff. In accordance with agreed on procedure, the projects were managed administratively by the University using purpose-designated project accounts, and once the project was completed the University invoiced the Ministry for reimbursement of the costs.

The following table summarizes the number and \$ value of the minor capital projects funded in 2004/05 by location.

Table 5.5:

Station	# of Projects	Total Cost *
Alfred College	3	71,492
Alma Res. Stn	6	86,968
Arkell Equine Res. Stn.	5	72,026
Arkell Feedmill	1	31,338
Arkell Poultry Res. Stn.	4	213,249
Arkell/Elora Res. Stn. Operations	6	90,227
Arkell Swine Res. Stn.	6	468,863
Elora Beef Res. Stn.	8	407,726
Elora Crop Science Res. Stn	6	133,007
Elora/Ponsonby Dairy Res. Stn.	5	144,377
Kemptville College	9	244,743
Muck Res. Stn	4	42,944
New Liskeard Res. Stn.	5	173,331
Ponsonby General Res. Stn.	4	27,483
Ponsonby Sheep Res. Stn.	3	19,910
Ridgetown College	9	163,707
Simcoe Res. Stn.	3	24,376
Turfgrass Res Institute	2	24,383
Office of Research Guelph	1	9,517
Vineland Res. Stn.	5	39,010
Winchester Res. Stn.	1	28,438
Woodstock Res. Stn.	6	50,438
Total	102	2,567,552

** includes a few approved projects at the stations that were managed directly between OMAFRA and ORC*

In addition to the above, other monies were allocated but managed directly between OMAFRA and ORC for several decommissioning projects, support for the Elora Beef Barn capital project, the Ridgetown Rural Development Center, and the HVAC system in the Lab Services building at 95 Stone Road.

6. MEDIA COVERAGE

Between May 2004 and April 2005, the combined efforts of students in Owen Roberts's agricultural communication classes and in Students Promoting Awareness of Research Knowledge (SPARK), both based at the University of Guelph, have produced the following list of published articles and stories on a variety of OMAFRA-sponsored projects. These articles have appeared in a number of different periodicals and publications, and cover the spectrum of the University's many different research institutions and sites, including the Axelrod Institute of Ichthyology, Laboratory Services Division, the regional campuses – Kemptville College, Ridgetown College and Collège d'Alfred – and the research stations in Vineland and Arkell, as well as the six colleges on U of G's main campus. The main vehicles for publication are the Ontario farm media, the Guelph *Mercury* through the weekly column *SPARKPlugs* and the University's *Research* magazine. In addition, selected articles are also distributed over the Canadian Press Wire Service, which allows for extensive exposure of OMAFRA's research projects. Through the agreement with OMAFRA's Town & Country Ontario, television now sees the students contribute InfoBreaks to that program, as well. These and other articles can be accessed from the U of G Research News website at www.uoguelph.ca/research/news/index.shtml and general information on the University's research communications can be found at www.uoguelph.ca/research/communications/index.shtml.

* * *

Research Magazine Spring 2004

"Reinforcing Ontario's rural foundation," *Research Magazine* – Spring 2004 (David Douglas, School of Environmental Design and Rural Development)

"A rural makeover," *Research Magazine* – Spring 2004 (Belinda Leach, Department of Sociology and Anthropology)

"Farms grow – and so does management," *Research Magazine* – Spring 2004 (John Cranfield, Department of Agricultural Economics and Business)

"Giving credentials where they're due," *Research Magazine* – Spring 2004 (Harald Bauder, Department of Geography)

Pig Pens Summer 2004

"Cutting in-transit losses with Ontario-specific data," *Pig Pens* - Summer 2004 (Cate Dewey, Department of Population Medicine)

Pig Pens Winter 2005

"Towards safer swine semen," *Pig Pens* – Winter 2005 (Mary Buhr, Department of Animal and Poultry Science)

"Keeping an Ontario-wide eye on food safety," *Pig Pens* – Winter 2005 (Robert Friendship, Department of Population Medicine)

"A current event," *Pig Pens* – Winter 2005 (Nigel Bunce, Dorin Bejan, Department of Chemistry)

Focus on DHA July 2004

“Mighty milk,” *Focus on DHA* – July 2004 (Brian McBride, Department of Animal and Poultry Science)

Focus on Food and Health November 2004

“Getting soy into our systems,” *Focus on Food and Health* – November 2004 (Alison Duncan, Human Biology and Nutritional Services)

Good Food Better Health Summer 2005

“Drink milk, control hunger,” *Good Food Better Health* – Summer 2005 (Harvey Anderson, France Cho, Department of Nutritional Sciences at University of Toronto)

Two stories under the title “Soy: a bean for better health.”

1. “Scientists look to develop high-isoflavone soybeans,” *Good Food Better Health* – Summer 2005 (Istvan Rajcan, Department of Plant Agriculture)
2. “New Research puts functional soy component right in the breadbasket,” *Good Food Better Health* – Summer 2005 (Alison Duncan, Department of Human Biology and Nutritional Services)

“The road to bran’s untapped potential,” *Good Food Better Health* – Summer 2005 (Steve Cui, Agriculture and Agri-Food Canada)

“Fitting more fiber into food,” *Good Food Better Health* – Summer 2005 (Doug Goff, Department of Food Science)

“Battle of the breads,” *Good Food Better Health* – Summer 2005 (Arend Bonen, Alison Duncan, Terry Graham and Lindsay Robinson, Department of Human Biology and Nutritional Services)

“Friendly fat,” *Good Food Better Health* – Summer 2005 (Lindsay Robinson, Department of Human Biology and Nutritional Services)

“Flower power means better sight,” *Good Food Better Health* – Summer 2005 (Steve Leeson, Department of Animal and Poultry Science)

“A bioactive boost for soy,” *Good Food Better Health* – Summer 2005 (Julia Green, University of Ontario Institute of Technology)

“What consumers don’t know could hurt sales,” *Good Food Better Health* – Summer 2005 (Spencer Henson, Department of Agricultural Economics and Business)

Guelph Mercury

“Research works to make water safer,” *Guelph Mercury* – May 12, 2004 (Andrew Peregrine, Department of Pathobiology)

“Ice cream made creamier by research,” *Guelph Mercury* – June 18, 2004 (Doug Goff, Department of Food Science)

“Fruit breeders seek early ripening cherry,” *Guelph Mercury* – July 23, 2004 (Jayasankar Subramanian, Department of Plant Agriculture)

“Indexing offensive E. coli bacteria,” *Guelph Mercury* – August 20, 2004 (Carlton Gyles, Department of Pathobiology)

“U of G research is rounding up the resisters,” *Guelph Mercury* – August 27, 2004 (Robert Friendship, Scott McEwen, Richard Reid-Smith and Nicol Janecko, Department of Population Medicine)

“Getting soy into our systems a good idea,” *Guelph Mercury* – November 12, 2004 (Alison Duncan, Department of Human Biology and Nutritional Sciences)

“When food bites back,” *Guelph Mercury* – November 19, 2004 (Mansel Griffiths, Department of Food Science)

“Guelph researcher shows modern seeds out perform heritage seeds,” *Guelph Mercury* – February 11, 2005 (Duane Falk, Department of Plant Agriculture)

“Asian beetles bugging Ontario’s fine wines,” *Guelph Mercury* – March 11, 2005 (Mark Sears, Department of Environmental Biology)

“E. coli bacteria test kits put to test by researcher,” *Guelph Mercury* – April 15, 2005 (Joseph Odumeru, Laboratory Services)

At Guelph

“Insects bug Ontario’s fine wines,” *At Guelph* – April 6, 2005 (Mark Sears, Department of Environmental Biology)

“A new breed of healthier cows,” *At Guelph* – March 9, 2005 (Bonnie Mallard, Department of Pathobiology)

“Modern oat, barley outyield heritage varieties whether grown conventionally or organically,” *At Guelph* – February 23, 2005 (Duane Falk, Department of Plant Agriculture)

“Getting soy into our systems,” *At Guelph* – November 10, 2004 (Alison Duncan, Department of Human Biology and Nutritional Services)

“Eggs hold key to food safety,” *At Guelph* – June 2, 2004 (Yoshinori Mine, Department of Food Science)

“Targeting the source,” *At Guelph* – May 19, 2004 (Chris Kinseley, College d’Alfred)

Pigs Pork and Progress 2005

“Atkins-style diets less than ideal for pigs,” *Pigs Pork and Progress 2005* (Kees de Lange, Department of Animal and Poultry Science)

“Addressing the origin of manure odours – food,” *Pigs Pork and Progress 2005* (Ming Fan, Department of Animal and Poultry Science)

“A shot in the arm for hog health,” *Pigs Pork and Progress* 2005 (Dongwan Yoo, Department of Pathobiology)

Pork News

“Healthier pigs, healthier people,” *Pork News* – May 2004 (Cate Dewey, Robert Friendship, Department of Population Medicine)

“Lighting the way to better pork,” *Pork News* – June 2004 (Howard Swatland, Department of Animal and Poultry Science)

“Antibiotics: less is more in fighting swine disease,” *Pork News* – July 2004 (Cate Dewey, Department of Population Medicine)

“New approach to battling PRRS virus,” *Pork News* – October 2004 (Dongwan Yoo, Department of Pathobiology)

“Customized diets for swine,” *Pork News* – November 2004 (Ming Fan, Department of Animal and Poultry Science)

“Small efforts, small piglets – big difference,” *Pork News* – January 2005

“Cutting in-transit losses with Ontario-specific data,” *Pork News* – February 2005 (Cate Dewey, Department of Population Medicine)

The Milk Producer

“Show me the money,” *The Milk Producer* – May 2005 (Bill Bettger, Department of Human Biology and Nutritional Services, and Brian McBride, Department of Animal and Poultry Science)

“Hale and hardy,” *The Milk Producer* – February 2005 (Bonnie Mallard, Department of Population Medicine)

“Clean bill of health,” *The Milk Producer* – November 2004 (David Léger, graduate student of the Department of Population Medicine)

“Hands on versus hands off,” *The Milk Producer* – October 2004 (Dennis McKnight, Department of Animal Science)

“Cycling for dollars,” *The Milk Producer* – September 2004 (Stephen LeBlanc, Department of Population Medicine)

“Humane approach,” *The Milk Producer* – July 2004 (Todd Duffield, Department of Population Medicine)

“Formulating better diets,” *The Milk Producer* – May 2004 (Brian McBride, Department of Animal and Poultry Science)

Ontario Dairy Farmer

“Taking pain by the horns,” *Ontario Dairy Farmer* – April 2005 (Todd Duffield, Department of Population Medicine)

“Parasite watchdogs,” *Ontario Dairy Farmer* – January/February 2005 (Andrew Peregrine, Department of Pathobiology)

“A new approach to longevity,” *Ontario Dairy Farmer* – May/June 2004 (Larry Schaeffer, Department of Animal and Poultry Science)

Ontario Beef Farmer

“Turning manure into a cash cow,” *Ontario Beef Farmer* – Late Spring 2005 (Ron Fleming, Ridgetown College)

Ontario Hog Farmer

“Beating the clock on farrowing,” *Ontario Hog Farmer* – June 2004 (Glen Cassar, Robert Friendship, Department of Population Medicine)

Ontario Poultry Farmer

“Halting hen hemorrhages,” *Ontario Poultry Farmer* – Summer 2005 (Jim Squires, Department of Animal and Poultry Science)

“Making connections up the chain,” *Ontario Poultry Farmer* – Spring 2005 (Al Dam)

“Disease-free chickens – in one shot,” *Ontario Poultry Farmer* – Fall 2004 (Eva Nagy, Department of Pathobiology)

“Eggs hold food safety secret,” *Ontario Poultry Farmer* – Summer 2004 (Yoshinori Mine, Department of Food Science)

Ontario Beef

“A better bar for the best beef,” *Ontario Beef* – February 2005 (Steve Miller, Department of Animal and Poultry Science)

“Tailoring the pasture menu,” *Ontario Beef* – October 2004 (Ann Clark, Department of Plant Agriculture)

“A facility for the future,” *Ontario Beef* – May 2004 (Steve Miller, Department of Animal and Poultry Science)

Greenhouse Canada

“Attaching the root of the problem,” *Greenhouse Canada* – September 2004 (John Sutton, Nathan Owen-Going, Department of Plant Agriculture)

“Reducing residues in the greenhouse,” *Greenhouse Canada* – September 2004 (Keith Solomon, Jim Bestari, Centre for Toxicology)

“Far-out research, earthly applications,” *Green house Canada* – September 2004 (Bernard Grodzinski, Department of Plant Agriculture)

“Light loving tomatoes,” *Greenhouse Canada* – September 2004 (Barry Micallef, Department of Plant Agriculture)

The Grower

“Researchers explore upright and columnar peach tree varieties,” *The Grower* – November 2004 (John Cline, Department of Plant Agriculture)

“Guelph fruit breeders look for cherries that will ripen earlier and last longer,” *The Grower* – October 2004 (Jayasankar Subramanian, Department of Plant Agriculture)

AgriDigest

“Edible vaccine technology takes a bite out of shipping fever,” *AgriDigest* – October/November 2004 (Patricia Showen, Department of Pathology)

“Sweetening the deal for farmers,” *AgriDigest* – October/November 2004 (Marcel Schlaf, Department of Chemistry and Biochemistry)

APRIL 2005

7. UNIVERSITY OF GUELPH/ OMAFRA EQUIPMENT INVENTORY & LIBRARY RESOURCES

<u>Summary of U of G / OMAFRA Equipment Inventories</u>				
For Fiscal 2004/2005				
<u>Location Name</u>	<u>Opening Balance*</u> (May 1, 2004)	<u>Acquisitions</u> (during 04/05)	<u>Dispositions</u> (during 04/05)	<u>Ending Balance</u> (April 30, 2005)
<u>Summary (totals of detailed data, below)</u>				
All OMAFRA Program locations	51,723,858 191,249*	2,508,455	4,478,573	49,562,491
<u>Individual Location Details</u>				
Alfred College	1,944,910 20,890*	61,816	176,195	1,809,641
Alma Aquaculture	974,243 100,581*	52,036	34,624	891,074
Arkell Bull & Ram	40,000	-	40,000	-
Arkell Equine	8,000	26,000	-	34,000
Arkell Feedmill ⁽¹⁾	832,000	-	-	832,000
Arkell Poultry	656,300	166,900	-	823,200
Arkell Swine	511,000	-	-	511,000
Elora Beef	916,040 21,425*	655,349	43,140	1,506,824
Elora Dairy	680,200	171,100	16,000	835,300
Elora Plant Ag.	2,803,775	-	-	2,803,775
Emo	80,500	-	-	80,500
Guelph Research Station Operations ⁽²⁾	2,934,447	2,400	-	2,936,847
Guelph Turfgrass	27,550 1,550*	5,550	-	31,550
Isolation Unit	11,000	-	-	11,000
Kemptville College	1,508,719	187,723	30,800	1,665,642
Bradford Muck Stn ⁽³⁾	259,489 17,600*	-	-	241,889
NLARS	1,057,400	15,494	147,000	925,894
Ponsonby Dairy	358,500	16,500	7,000	368,000
PGAF	289,284 12,690*	7,500	1,400	282,694
Ponsonby Sheep	173,570 12,250*	5,000	64,300	102,020
Ridgetown College ⁽⁴⁾	5,217,877	592,591	186,878	5,623,590
Simcoe	712,000	8,900	89,500	631,400
Thunder Bay	78,500	-	-	78,500
Woodstock	576,800	1,465	121,400	456,865
Vineland	3,006,683 4,262*	-	133,800	2,868,621
Lab Services	26,065,071	532,130	3,386,536	23,210,665

<u>Library Resources</u>	
<u>Location</u>	<u>Replacement Value \$ ('000)</u>
Alfred	764
Kemptville	1,163
Ridgetown	1,227

⁽¹⁾ Purchase Price for Blower Wagon of \$20,000 was omitted from last year's inventory list.

⁽²⁾ Adjustment to Opening Balance - Disposition Costs were recorded as Value Received for items instead of Purchase Price in 03/04. This year's Opening Balance reflects the adjustment of \$36,176.

⁽³⁾ Adjustment to Opening Balance - \$6,800 was entered as text instead of numbers under Purchase Price in 03/04.

⁽⁴⁾ Library cost of \$593,000 were adjusted to last years total

* Cost adjustments to Opening Balance for removing items under \$1,000. In previous years the total assets reported for several locations included assets valued individually at less than \$1,000. To treat all locations on an equitable basis, and be consistent with the reporting requirements specified in the Agreement PMAs, these assets were removed from the reported asset values, with the adjustments as shown for each location.

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8. INVENTORY AND RENTS OF DWELLING HOUSES STATUS

Kemptville College		# Units		
Kemptville		1		
New Liskeard		<u>3</u>		
Total		4		
Revenue			13,204	
Expenses			<u>15,403</u>	
Account balance: Opening				51,473
Closing				49,274
Ridgetown College				
Ridgetown		2		
Cedar Springs		<u>1</u>		
Total		3		
Revenue			22,417	
Expenses			<u>38,395</u>	
Account balance: Opening				53,047
Closing				37,069
Guelph Stations				
Ariss		3		
Alma		1		
Hall House		1		
Ponsonby		1		
Arkell		3		
Simcoe		1		
Vineland		<u>2</u>		
Total		12		
Revenue			65,200	
Expenses			<u>39,598</u>	
Account balance: Opening				5,598*
Closing				31,200

* An adjustment was made to the closing balance in last year's Annual Report.

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9. LIVESTOCK INVENTORIES

	OPENING MAY 1, 2004	SOLD	DIED ⁽¹⁾	TRANSFERRED		BORN OR ACQUIRED	CLOSING APRIL 30, 2005
				IN	OUT		
ALFRED							
DAIRY	68	31	5	0	0	41	73
KEMPTVILLE							
DAIRY	115	106	8	0	0	67	68
NEW LISKEARD							
BEEF	343	148	4	0	0	152	343
RIDGETOWN							
DAIRY	64	27	4	0	0	40	73
BEEF	36	16	1	0	0	7	26
SWINE	399	1225	46	21	1	1252	400
GUELPH							
ARKELL EQUINE	61	7		249	251	13	65
ARKELL POULTRY	6,302		2,604	20	3,980	10,531	10,269
ARKELL SWINE	1,995	3,780	2,155		810	6,689	1,939
ALMA AQUA	112,300	58,373	57,665	8,599	20,324	134,192	118,729
ELORA DAIRY	301	99	27	4	34	155	300
ELORA BEEF	411	227	12	9	9	293	465
PONSONBY DAIRY	98	32	7	7	17	54	103
PONSONBY (GAF) ⁽²⁾	68	85	6	136	119	58	52
PONSONBY SHEEP	480	294	20	0	150	456	472
CLINICAL STUDIES							
DAIRY	118	5	0	55	0	0	168
SWINE	10	0	0	27	0	0	37
SHEEP	44	0	0	108	0	0	152

⁽¹⁾ These figures include animals that are born dead and those which are euthanized for humane, disease and research reasons.

⁽²⁾ General Animal Facility

10. ACRONYMS

AAFC	Agriculture and Agri-Food Canada
AHL	Animal Health Laboratory
AI	Artificial Insemination
ARD	Agriculture and Rural Division
ARIO	Agricultural Research Institute of Ontario
AVMA	American Veterinary Medical Association
BDO	Business Development Office
BDTG	Business Development and Training Group
CCAC	Canadian Council of Animal Care
CE	Continuing Education
CEP	Clinical Education Program
CFI	Canadian Foundation for Innovation
CFIA	Canadian Food Inspection Agency
CHA	Canadian Healthcare Association
CRTI	Clinical Research Training Institute
CVMA	Canadian Veterinary Medical Association
CVO	College of Veterinarians of Ontario
DFC	Dairy Farmers of Canada
DFO	Dairy Farmers of Ontario
DVM	Doctor of Veterinary Medicine
DVSc	Doctor of Veterinary Science
EBI	Eastern Breeders Incorporated
EHS	Environmental Health & Safety
EOYr	End of Year
ERP	Emergency Response Plan
ETAA	Environmental Technology Assessment for Agriculture
FID	Food Industry Division
FTE	Full Time Equivalent
GLP	Good Laboratory Practices
HACCP	Hazard Analysis and Critical Control Point
HRIO	Horticultural Research Institute of Ontario
IP	Intellectual Property
IPM	Integrated Pest Management
IPO	Initial Public Offering
KC	Kemptville College
LOI	Letter of Intent
LS	Laboratory Services Division
MOE	Ministry of the Environment
MTCU	Ministry Training, Colleges and Universities
NCE	Network of Centres of Excellence
NEFA	Non-esterified fatty acids
NLARS	New Liskeard Agricultural Research Station
OABA	Ontario Agri Business Association
OAC	Ontario Agricultural College
OAVT	Ontario Association of Veterinary Technicians
OIT	Ontario Innovation Trust
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
OPEP	Ontario Pesticide Education Program
ORC	Ontario Realty Corporation
OVC	Ontario Veterinary College
PCR	Polymerase Chain Reaction
PMA	Performance Measures Agreement
RC	Ridgetown College
RFP	Request for Proposal

RME	Resource Management and Environment
SPARK	Students Promoting Awareness of Research Knowledge
SRC	Sustainable Rural Communities
TOGA	The Ontario Greenhouse Alliance
U of G	University of Guelph
VCEP	Veterinary Clinical Education Program
VTH	Veterinary Teaching Hospital
WTO	World Trade Organization