2/27/96 FINAL

Section I
General Information

1. **PROJECT NUMBER**: LNE91-27A
GRANT NUMBER:
FUNDING PERIOD: 1/1/94 - 12/31/95

2. **PROJECT TITLE**: An Integrated Response to Pollination Related Problems Resulting from Parasitic Honey-Bee Mites, the Africanized Honey Bee, and Honey-Bee Pathogens

3. **PROJECT COORDINATOR/PROJECT MANAGER**:
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4. **TYPE OF REPORT**: *(Circle one)* ANNUAL / FINAL

5. **DATE OF REPORT**: 2-27-96

6. **REPORTING PERIOD**, from 1/1/94 - 12/31/95

7. **MAJOR PARTICIPANTS**:

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8. **COOPERATORS**:

Mr. Dennis Keeney, Keeney and Zeigler Apiaries, 9351 Old 22, Bethel, PA 19507-9422, (717) 933-8565.
- Provide 100 colonies of honey bees (equipment) and associated management time for evaluation of control strategies for chalkbrood and other honey-bee pathogens. Participate in experimental set-up and data collection. This represents a total work investment of one month.

Mr. Robert H. Wright, Rd. 2 Box 190, Monroeville, NJ 08343, (609) - 358-7471, (609) - 358-3176.
- Provide 200 colonies of bees (equipment) and associated management time for evaluation of control strategies for chalkbrood. Participate in experimental set-up and data collection. This represents a total work investment of one month.

9. **PROJECT STATUS:**

Please check one of the following. The project is:

_____ **New**: receiving SARE or ACE funding, for the first time.

__x__ **Continuation**: no major chance in direction or objectives.

_____ **Renewal**: project whose SARE or ACE funding was interrupted one or more funding cycles.

_____ **Revision**: change in one or more objectives of a SARE or ACE project.

_____ **Change Funding Source**: from SARE to ACE or from ACE to SARE. (Please describe the change:)

10. **STATEMENT OF EXPENDITURES: attached**

Section II

1. OBJECTIVES:

Reliable pollination of crops is an essential determinant of farm productivity and the stability of farm incomes and food prices. The honey bee, *Apis mellifera*, provides essential pollination services for over 90 crops in the US. The value of increased production attributable to honey-bee pollination is estimated to be between $9.3 billion and $19.9 billion annually. Two million honey-bee colonies are rented annually to provide this service. Three major crops in the northeast region - apples, blueberries, and cranberries - depend almost entirely on the honey-bee for sustained commercial yields. The recent introduction of two parasitic mites, the tracheal mite, *Acarapis woodi* and the Varroa mite, *Varroa jacobsoni*, has resulted in a substantial reduction in the number and quality of honey-bee colonies available for pollination. Overwintering losses of 20 - 40% among commercial migratory operators due to infestation with parasitic mites is common. The purpose of the proposed program is to ensure the availability of healthy honey-bee colonies for crop pollination in the Northeast region.

Our program involves 3 major objectives: 1) Development of natural products as acaricides and antibiotics: This project involves the evaluation of naturally-occurring, botanical compounds, with low mammalian toxicity, for control of parasitic mites and honey-bee pathogens; 2) Development of an economic model for the analysis and planning of commercial beekeeping: The model examines revenues and expenses and relates them to changes in market demand/price for honey, pollination, and other hive products. This analysis will assist beekeepers in developing their operations to meet the pollination demands of growers in the northeast in a more efficient and profitable manner than is achieved with current practices. A computerized, user-friendly model will be developed based on that analysis for use by beekeepers to assist them in maximizing the efficiency and productivity of their operations; 3) Development of a grower education program: The development of educational material instructing growers on the proper criteria by which to evaluate honey-bee colonies and on the proper procedures required to conduct these evaluations will enable growers to become knowledgeable consumers of pollination services and will motivate the beekeeper to provide the highest possible quality colonies.

2. ABSTRACT:

Four oils derived from seeds were found to be effective control agents for the parasitic tracheal mite, *A. woodi* (Rennie), in colonies of the honey bee, *A. mellifera* (L.). Treatments were peanut, soybean, sunflower, and canola oil, delivered as patties after blending with confectioner sugar. Colonies in all experimental groups had similar mite prevalence values (proportion of infested bees) and parasite load scores (a measure of the number of mites per bee) prior to initiating treatment in September, 1992. Each colony received five, 500 g patties delivered approximately every 14 days. Mite prevalence values, parasite load scores, and colony weight gains (an indicator of honey production) were measured the following spring. Average post-treatment mite prevalence values in the treated groups ranged from 0.015 to 0.027, compared to 0.094 in the control group. The mite prevalence value in each treatment group was less than the mite prevalence value in the control group ($P < 0.05$). Similar differences were observed for parasite load scores.

The evaluation of the efficacy of natural products for the control of the parasitic honey-bee mites *V. jacobsoni* and *A. woodi* conducted in the fall (no brood present) of 1993 was completed. The average mortality of *V. jacobsoni* during the treatment period, was 96.7 % in the colonies receiving the thymol-based blend of natural products, 27.5 % in the colonies receiving linalool, and 4.4 % in the control colonies.

Evaluations of compounds previously identified as effective against the mite *V. jacobsoni* in the absence of brood (immature bees) were conducted at a time when there were large amounts of brood present . Compounds were tested on ca. 152 colonies at two doses. At the high dose,. thymol/cineole resulted in 55% mite mortality, thymol /citronellal resulted in 40% mortality, thymol/linalool resulted in 39% mortality, while control colonies had 29% mortality. At the low dose, these same formulations resulted in 44%, 39%, and 30% mortality, respectively. The thymol based treatments (high dose only) were also evaluated for efficacy against the tracheal mite using 32 colonies. Mite populations in colonies receiving thymol/cineole grew an average of 9.2% during the experimental period, populations in colonies receiving thymol/citronellal decreased by 22.4%, and populations in colonies receiving thymol/linalool decreased by 0.06%. Control populations grew 28.3%. A new method for estimating infestation rates of *V. jacobsoni* in honey bee colonies was developed. A method for subsampling "sticky-boards" to estimate numbers of mites collected was developed.

The Bee Economics model of the beekeeping industry was completed. Documentation was prepared and model distribution is under exploration. The model consists of 3 modules to assist beekeepers in planning their operations. The Record Keeping module allows for identification of revenues and expenses in a beekeepers complete operation. This module generates financial statements, operating statements, and assists the beekeeper in determining cash flow and net worth. The Bee Planner module allows the user to forecast their beekeeping operation four years into the future or to forecast one year into the future under four different scenarios. The Enterprise Analysis module allows the beekeeper to analyze each enterprise in their operation. Additional progress was made on the Bee Economics model of the beekeeping industry.

The educational video was completed. This video presentation is designed to assist growers in their efforts to evaluate honey bee colonies rented for pollination of fruit and seed crops. A companion booklet was developed that discusses the process of selecting colonies for evaluation, interpreting the data that are collected, and caring for honey bees while they are in the field. The video and booklet will be distributed by The A. I. Root Company under an agreement with USDA-ARS.

3. SPECIFIC PROJECT RESULTS:

I. Evaluation of botanicals

A. Findings and accomplishments:

Four oils derived from seeds were found to be effective control agents for the parasitic tracheal mite, A. woodi (Rennie), in colonies of the honey bee, *A. mellifera* (L.). Seventy-one honey-bee colonies infested with the tracheal mite were each assigned to one of four treatment groups or to a control group. Treatments were peanut, soybean, sunflower, and canola oil, delivered as patties after blending with confectioner sugar (2 parts sugar / 1 part oil, w/w). All five groups had similar mite prevalence values (proportion of infested bees) and parasite load scores (a measure of the number of mites per bee) prior to initiating treatment in September, 1992. Each colony received five, 500 g patties delivered approximately every 14 days starting on September 16, 1992 and continuing until December 1, 1992. Mite prevalence values, parasite load scores, and colony weight gains (an indicator of honey production) were measured the following spring. Average post-treatment mite prevalence values in the treated groups ranged from 0.015 to 0.027, compared to 0.094 in the control group. The mite prevalence value in each treatment group was less than the mite prevalence value in the control group ($P < 0.05$). Similar differences were observed for parasite load scores. Differences in colony weight gains among the five groups were not significant ($P \leq 0.74$). This was most likely a consequence of the unusually low, post-treatment mite prevalence values in the control group. This low rate could have been the result of a natural decline in the mite population, or a consequence of the transference of oils from treatment colonies to control colonies due to the drifting of bees among colonies. Minimum effective application rates, effectiveness of alternate carriers, lethal and sub-lethal effects on bees, and contamination of honey remain to be investigated.

A blend of thymol, eucalyptus oil, menthol, and camphor was found to be an effective control agent for the parasitic honey-bee mite, *V. jacobsoni*. A second treatment, linalool, gave more variable results. Evaluations were conducted during the fall of 1993 using 24 honey-bee colonies infested with varroa. Each colony was maintained in 2, standard-depth Langstroth hive bodies and had > 15 combs of worker bees, a queen, and sufficient stores to survive the winter. Eight colonies were treated with linalool, 8 were treated with the thymol-based blend, and 8 served as controls. Two applications of test materials were made, the first on November 1, the second on November 12. Each application was delivered using a porous, inert carrier saturated with approximately 17 g of test material. The eight control colonies received the inert carrier without test material. Mite collection devices were placed on the bottom boards of each colony at the time when the first treatment was applied and were replaced when the second application was made. On November 19, the end of the treatment period, fluvalinate strips were placed in each of the 24 colonies to kill any remaining mites. New collection devices were placed in the colonies at that time. Strips and collection devices were kept in the colonies until December 17. The average mite mortality during the treatment period, was 96.7 % in the colonies receiving the thymol-based blend of natural products, 27.5 % in the colonies receiving linalool, and 4.4 % in the control colonies. These tests were conducted when there was little or no brood (immature bees) present in the colonies.

Evaluation of three thymol-based treatments as control agents for *V. jacobsoni* were conducted when there were large amounts of brood present in colonies. Compounds were tested at two concentrations on ca. 152 colonies. Overall, thymol/solvent-carrier resulted in the following *V. jacobsoni* mortality:

carrier	2- 25g doses	2 -12.5g doses
cineole*	55%	44%
citronellal	40%	39%
linalool	39%	30%
control	29%.	29%

Thymol/cineole resulted in significantly greater mortality than found in the controls at both doses. These treatments were also evaluated for efficacy against the tracheal mite, *A. woodi*, using 32 colonies. Overall, thymol/solvent-carrier affected tracheal mite population growth as follows:

carrier	2- 25g doses
cineole	9.2%
citronellal*	-22.4%
linalool	-0.06%
control	28.3%

Thymol/citronellal-carrier provided significant suppression of mite populations compared to the controls (*$P<0.05$ compared to control group).

Many research projects involving *V. jacobsoni* require estimates of mite infestation rates. Currently, no validated sampling technique is available. Therefore, a sampling method for estimating infestation rates of *V. jacobsoni* in honey bee colonies was developed.. The ether roll, mite/bee ratio, mite/sample-volume ratio, and mite/sample-weight ratio were compared. A constant volume ether roll method, which is the easiest method to use, was found to provide a highly reproducible estimate of the actual mite/bee ratio after adjustment by a constant percent. Reproducibility was evaluated using the concordance correlation coefficient. This result will allow researchers to obtain statistically valid estimates of mite infestation rates.

Evaluating the effectiveness of potential acaricides for control of *V. jacobsoni* requires collecting mites on a sticky-board collection device placed on the bottom boards of hives. Since several thousand mites may be collected in this manner, and since a series of several collection devices are usually required, determining the actual number of mites can be extremely time-consuming. Typically, a sticky-board collection device has a grid with 200-300 1-inch cells printed on the collection surface to facilitate counting the mites. A method for subsampling "sticky-boards" to estimate numbers of mites collected was developed that requires the investigator to score only 25% of the grid cells. These results are being prepared for publication.

The loss of a full-time technician at the Bee Research Laboratory in June, 1995 resulted in the curtailment of the evaluation of these compounds for control of honey bee pathogens. Accordingly, $6, 604.00 are being returned from Bee Research Laboratory allocation.

B. Dissemination of findings:

1. PUBLICATIONS:

1. Calderone N. W. and Spivak, M. (1995) Plant extracts for control of the parasitic mite V. jacobsoni (Acari: Varroidae) in colonies of the western honey bee (Hymenoptera: Apidae). J Econ. Entomol. 88: 1211-1215:

2. Calderone N. W. and Shimanuki, H. (1995) Evaluation of four seed-derived oils as controls for A. woodi (Acari: Tarsonemidae) in colonies of A. mellifera (Hymenoptera: Apidae). J. Econ. Entomol. 88:805-809.

3. Shimanuki H. Calderone, N. W., and Knox, D. (1994) Parasitic mite syndrome - I. The symptoms. Amer. Bee J. 134:827-828.

4. Calderone N. W. and Shimanuki H. (1994) An in vitro evaluation of botanical compounds for the control of the honey-bee pathogens Bacillus larvae, Bacillus alvei, and the secondary invader Ascosphaera apis. J. Ess. Oil Res.6: 279-287.

5. Calderone N. W. and Shimanuki H. (1993) Distribution of tracheal mites among the mesothoracic tracheal trunks of the honey bee, A. mellifera. Exp. Appl. Acarol. 17:663-672.

6. Calderone, N. W. (submitted) Comparison of sampling methods for estimating infestation rates of *V. jacobsoni* in colonies of the honey bee, *A. mellifera*.

7. Calderone, N. W. (in prep) A sub-sampling method for estimating numbers of *V. jacobsoni* on sticky-boards.

8. Calderone, N. W., Wilson, W. T. and Spivak, M. (in prep) Effectiveness of thymol-based treatments for control of the parasitic mites *V. jacobsoni* and *A. woodi* in honey colonies of the honey bee, *A. mellifera*.

2. WORKSHOP/CONFERENCE/FIELD DAY

Presentation: Natural products for the control of parasitic bee mites.
Maryland State Beekeepers Annual Meeting
6/17/94
70 persons in attendance

Presentation: Natural products for the control of parasitic bee mites.
Virginia State Beekeepers Annual Meeting
11/5/94
80 people in attendance

Presentation: Natural products for the control of parasitic bee mites.
23rd Annual Eastern Apiary Inspector and Extension Apiculturist Workshop
3/7/94 - 3/9/94
49 people in attendance

Presentation: An integrated pest management program for control of the parasitic honey bee mite *V. jacobsoni.*
Apiary Inspectors of America Annual Meeting
Beltsville, MD
1/95
75 people in attendance

Presentation: An integrated pest management program for control of the parasitic honey bee mite *V. jacobsoni.*
Department of Entomology
Cornell University
Ithaca, NY
9/95
35 people in attendance

Presentation:An integrated pest management program for control of the parasitic honey bee mite *V. jacobsoni.*
Empire State Honey Producers' Association Annual Meeting
Syracuse, NY
11/95
45 people in attendance

C. Site information: N/A

D. Economic analysis:
Currently, beekeepers spend up to $12.00/colony/year on fluvalinate treating for V. *jacobsoni*. They spend an additional $2.15/colony/year for menthol treating for *A. woodi*, and $1.00/colony/year treating prophylactically for bacterial infections. The goal of the current project is to identify a single natural product or blend of products that can be economically substituted for all of these medications. All of the natural products tested here can be obtained in bulk from chemical supply companies at very low costs. A single treatment with natural products will be less than the total cost for the three medications currently required. However, it is not yet certain whether the botanicals will be adequate as a stand alone treatment, or if they will be a component in an IPM program. If they can be used as a stand alone treatment, labor savings will be significant. If they are used as a component in an IPM program, additional labor may be required.

II. Economic modeling

A. Findings and accomplishments:

The Bee Economics model of the beekeeping industry was completed. Documentation was prepared and model distribution is under exploration. The model's three modules are used to assist beekeepers in planning for their operations. The Record Keeping module allows for identification of revenues and expenses in a beekeeper's complete operation. This module generates financial statements, operating statements, and assists the beekeeper in determining cash flow and net worth. The Bee Planner module allows the user to forecast their beekeeping operation four years into the future under a single scenario describing the allocation of resources among enterprises, or one year into the future under four different resource allocation scenarios. The first year is derived from information available in the Record Keeping module. Other scenarios are based on inflation rates and adjustment factors for product production, prices, and expenses. Current product adjustment factors are derived from the economic analysis of those beekeeping operations in the Northeast region identified in a Cornell University survey. The economic analysis incorporates joint product production and externalities in the beekeeping industry. The Enterprise Analysis module allows the beekeeper to analyze each enterprise in the operation. The Analysis module allows the beekeeper to analyze each enterprise in the operation.

B. Dissemination of Findings:

1. WORKSHOP/CONFERENCE/FIELD DAY

Presentation: Bee Economics
23rd Annual Eastern Apiary Inspector and Extension Apiculturist Workshop
3/7/94 - 3/9/94
49 people in attendance

Presentation: Bee Economics
U.S. Department of Agriculture, Agriculture Research Service
Carl Bee Hayden Bee Research Center
Tucson, AZ
May, 1994
25 people in attendance

Presentation: Bee Economics
Minnesota Honey Producers Association
November 1995
50 people in attendance

2. PUBLICATIONS

1. Willett, L. S., Sanford, M. T., and Calderone, N. W. (in prep) Bee Economics, An Economic Model for Analysis of Beekeeping Operations. Cornell University, Department of Agricultural, Resource and Managerial Economics, Extension Bulletin.

C. Site information: N/A

D. Economic Analysis:
The economic analyses in this project is focused on the estimation of a profit and/or production function using data collected from a national survey of beekeepers. These data were used to calculate supply elasticities that can be used in the development of a model to assist beekeepers in determining the optimal strategy for resource allocation in their operation. The economic model assists beekeepers in determining the optimal strategy for resource allocation in their operation. The economic analyses in the project are not compatible with decision support systems such as Planetor/Budgetor or the whole-farm planning system developed at the University of Minnesota but includes a tool for beekeepers to use in financial analysis of their operation.

III. Educational video

A. Findings and accomplishments:
The video and the accompanying companion booklet have been completed. This video instructs growers on the basics of beekeeping and on the skills necessary for the proper evaluation of the colonies that they rent for pollination.

B. Dissemination of findings:

1. PUBLICATIONS:

Distribution of the video began during the winter of 1995. Distribution will be primarily through The A. I. Root Company.

2. WORKSHOP/CONFERENCE/FIELD DAY

Pickle Packers Conference
Held at ARS Beltsville Area, Beltsville, MD
4/21/94
Video presented to four groups of 25 persons each

Presentation: The Honey Bee: A Grower's Guide.
Video presentation to the Apiary Inspectors of America Annual Meeting
Beltsville, MD
1/95
75 people in attendance

C. Site information: N/A

D. Economic analysis:
Growers pay between $15.00 and $50.00 per colonies for pollination. The number of colonies rented varies from a few to several thousand. The economic benefit to the grower is derived from a) an increase in the quality of colonies rented through associated increases in yield, b) a decline in pollination expenses resulting from identification of colonies not satisfying contract specifications, and c) a decline in pollination expenses resulting from a decline in the number of colonies required for pollination. An economic analysis will

require the development of a regional or national database, tracking the number of colonies rented, the number of acres in production, the cost per colony, and the quality of those colonies measured in terms of bees and brood. As part of the distribution of the video and booklet, I am requesting that growers provide me with this information.

4. POTENTIAL CONTRIBUTIONS AND PRACTICAL APPLICATIONS:

A. Potential impacts:

The overall impact of these programs is the maintenance of a sustainable supply of honey bee colonies for pollination. 1) The successful development of a bio-rational pesticide system will result in an environmentally safe product (honey), eliminate potential health risks to beekeepers and consumers by reducing the use of chemicals with significant mammalian toxicity, and provide alternative control measures in the event that mites evolve resistance to fluvalinate. Total pesticide load may also be reduced if current antibiotic and acaricide treatments can be replaced by fewer chemicals with a broader spectrum of activity. The results will be a sustainable supply of healthy bees for crop pollination. 2) The application of economic modeling to beekeeping will enable beekeepers to more easily track total expenses, expenses by category (e.g. chemical control agents, feed), profitability by category (e.g. pollination services, honey, pollen, wax), as well as the relative profitability of different nectar-producing locations and pollination contracts. This information will enable beekeepers to more efficiently focus their production and cost-cutting efforts with in increase in overall profitability. 3) The use of the educational video by growers will result in more efficient use of pollination dollars because either the quality of colonies rented for pollination will increase or the amount paid for colonies will decrease. Growers can expect to recover the cost of inspections through increased productivity, reductions in rental fees for lower quality colonies, and an overall decline in the number of colonies required for pollination.

B. Pesticide reduction:

1. Apistan (fluvalinate); 2. Acaricide for *V. jacobsoni*; 3. Current recommendation is 1 strip per 5 combs of bees (approximately 4 strips per colony). The natural products being evaluated must still undergo more testing prior to seeking application for registration with EPA. The successful completion of this project will result in the elimination of the need for fluvalinate; 4. Recently granted a general use status; 5. Fluvalinate residue has been found in honey. Varroa mites in Italy have become resistant to fluvalinate. For both of these reasons, alternative chemical agents are being sought that have low mammalian toxicity or approval for use in foods by FDA; 6. Fluvalinate is the only registered agent for control of *V. jacobsoni*. Menthol, a natural product, is approved for control of *A. woodi*.

C. New Hypotheses:

During the course of this project, a new phenomenon has been identified. Colonies infested with *V. jacobsoni* develop infected larvae. These infections appear to be both bacterial and viral in origin. Treatment with antibiotics does not remedy the problem. Colonies decline rapidly after initial detection, and die. Preliminary evidence indicates that *V. jacobsoni* is involved in this phenomenon - termed parasitic mite syndrome. This hypothesis is supported by the finding that timely treatment with fluvalinate appears to stop the decline and return the colony to normal. It is not clear if the mite weakens the colony so that the larvae are more susceptible to opportunistic infections, or if the mites are transmitting a pathogen as they feed on the developing bees. The role of parasitic mites as vectors of honey bee pathogens should be investigated.

The effectiveness of the natural products used for control of *V. jacobsoni* was found to be dependent on whether or not there was brood in the colony at the time of treatment. Treatments were less effective when brood was present. However, when colonies have high levels of mites, delaying treatment until there is no brood left in the colony is not possible. This implies that these compounds, as currently formulated, will best serve as a component in an integrated pest management program, rather than as a stand alone remedy. The goal of such a program will be to utilize management techniques that keep the mite population at low levels throughout the spring and summer, in order that treatment with botanicals can be delayed until the fall, when there is little brood present. To this end, **1)** we have determined that mites show a strong preference for drone (male) brood, and it is easy for beekeepers to provide colonies with one or more frames with drone comb which can be removed from the colony and destroyed after the mites have entered it. This technique should be evaluated to see how effective it is in suppressing mite populations during the summer; **2)** we also determined that a large number of mites can be trapped on sticky-board collection devices when there is a large amount of brood in the colony, even when no treatment is applied. Data from the past year show that an average of 29% of the mites in control colonies were collected on sticky-boards during a 4 week period. The effect of continuous trapping of mites on mite population should be evaluated as an additional component of an integrate pest management program; **3)** formulating the natural products as contact acaricides, rather than as fumigants, may overcome the problem of treating colonies when there is a large amount of brood present. Such formulations should be evaluated.

5. Farmer Adoption and Direct Impact

A. Changes in practice:
Each of the projects in the current program is long-term in nature. Distribution of the educational video began in 1995. The economic model will be released during 1996. The evaluation of botanicals is a much longer range project At the present time, it remains to be determined whether the natural acaricides will serve as a stand alone treatment, or as a component of an IPM program, involving drone trapping and sticky-board trapping as the other components. Since this project involves the evaluation and registration of a chemical as a pesticide, it will take longer than the implementation of most new farming practices.

B. Operational recommendations: The education video has been released. The economic model will be released during 1996. Use of natural products cannot be recommended until compounds receive EPA registrations.

C. Farmer evaluations: The Bee Economics model was distributed to several cooperating beekeepers throughout the United States, although the focus is on beekeepers in the northeast region. Users of the Bee Economics model will be asked to provide feedback on usefulness and suggestions for updates. Additional work on the model will be determined by additional funding and beekeeper response. Based on their evaluations, the updated versions of the model and the instruction manual will be developed. Growers utilizing the educational video are being asked to provide the Bee Research Lab with data on the number of colonies rented, cost per colony, and number of acres in production. In addition, they are being asked to evaluate the video presentation. This information will be used to assess the impact of the educational program.

6. **PRODUCER INVOLVEMENT: During the period of this report.**
Number of growers/producers in attendance at:

__225__ Workshops
__84__ Conferences
__150__ Field Days
__60__ Other events (specify) - seminar

7. **AREAS NEEDING ADDITIONAL STUDY:** Identify any needs for new basic (fundamental) or applied (problem-solving) research, beyond the scope of the current project.

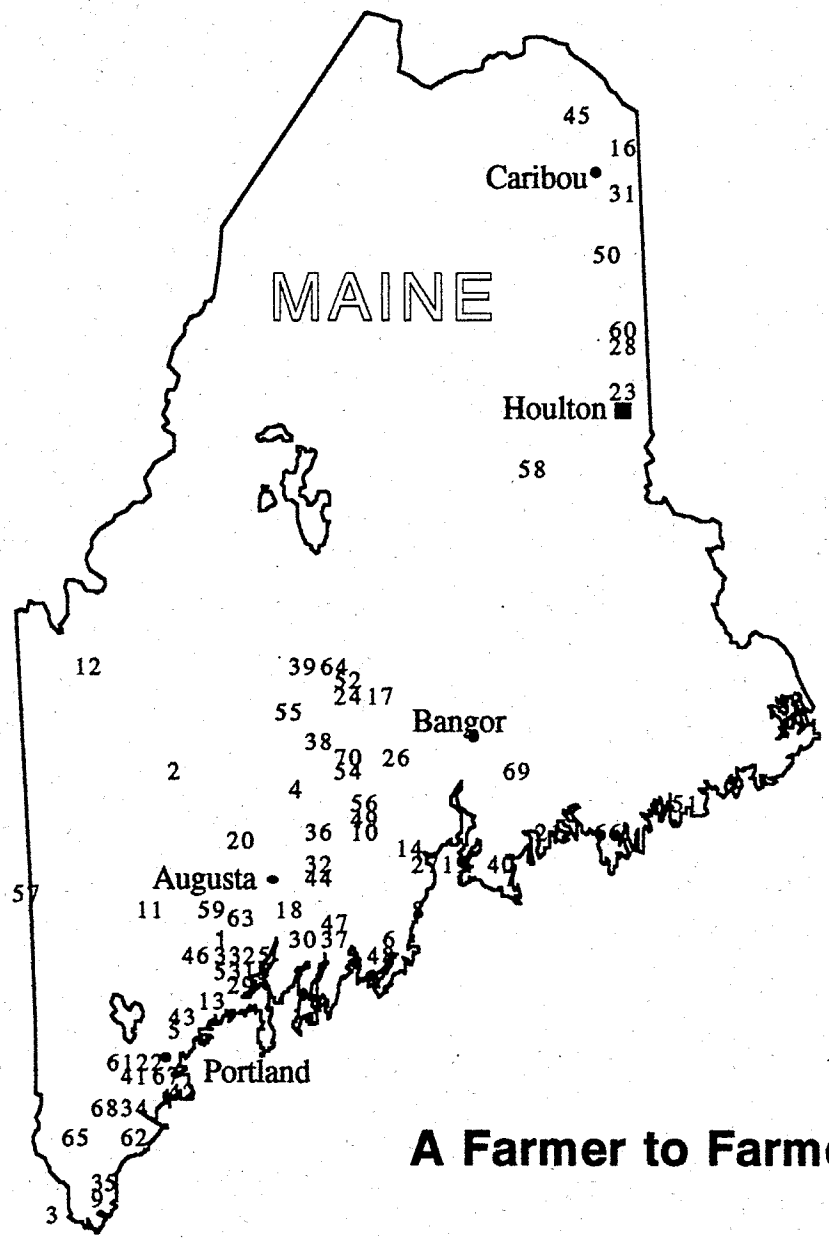
A. **Evaluation of botanicals**: The effectiveness of the natural products used for control of *V. jacobsoni* was found to be less effective when brood was present. However, when colonies have high levels of mites, delaying treatment until there is no brood left in the colony is not possible. Therefore, these compounds, as currently formulated, will best serve as a component in an IPM program, rather than as a stand alone remedy. The goal of the IPM program will be to utilize management techniques that keep the mite population at low levels throughout the spring and summer, in order that treatment with botanicals can be delayed until the fall, when there is little brood present. To this end, **1)** we have determined that mites show a strong preference for drone (male) brood, and it is easy for beekeepers to provide colonies with one or more frames with drone comb which can be removed from the colony and destroyed after the mites have entered the cells. This technique should be evaluated to determine its effectiveness in suppressing mite populations during the summer; **2)** we also determined that a large number of mites can be trapped on sticky-board collection devices when there is a large amount of brood in the colony. Data from the past year show that an average of 29% of the mites in control colonies were collected on sticky-boards during a 4 week period. The effect of continuous trapping of mites on mite population should be evaluated as an additional component of an integrated pest management program; and **3)** formulating the natural products as contact acaricides, rather than as fumigants, may overcome the problem of treating colonies when there is a large amount of brood present. Contact formulations should be evaluated.

B. **Economic modeling**: The role of depreciation in a beekeeper's operation is of interest. Incorporating depreciation in the Bee Economics model so that beekeepers can continually update their economic analysis should be pursued. Further, the model should be expanded to different software and hardware platforms.

C. **Educational video**: The current video instructs growers on the criteria they should use to evaluate the quality of colonies that they rent for pollination. Translating the data they accumulate from these inspections into a decision affecting payment to the beekeeper requires a statistically valid decision making process. The grower must know how many colonies to inspect, how to choose the colonies that are inspected to avoid introducing bias into the evaluation process, and how to relate the information gained from the inspections (in terms of means, variances, and probabilities) to the original agreement calling for a specific number of frames of brood and bees. This is a process well beyond the skills of most growers and should be addressed in order that the current educational video can be put to its best use.

8. **Photographs: none at this time**

Farmer to Farmer Directory



A Farmer to Farmer Tool

Eric Sideman
Maine Organic Farmers and Gardeners Association

Farmer to Farmer Directory

This project was funded in part by a grant from the Northeast Region Sustainable Agriculture Research and Education Program (SARE). I am the project coordinator. The success of this project is due to the involvement of many people. I want to give special thanks to the major participants who helped identify these noteworthy farmers. Many Extension personnel participated, including Richard Brzozowski, Wilfred Erhardt, Gleason Gray, Tim Griffin, Dave Handley, Richard Kersbergen, Donna Lamb, Barbara Murphy, Ed Plissey, and Richard Verville. Russell Libby from the Maine Department of Agriculture (now with MOFGA), Bill Bell from the Maine Association of Conservation Districts, Chris Smith from Soil Conservation Service, and Matt Liebman at the University of Maine also provided me with names of growers. Working together we identified about 250 farmers in Maine with practices or whole farm systems that we felt were illustrative of sustainable agriculture. Of course, it was difficult to get them all to respond to numerous questionnaires and farm visits. The 70 farms described here are operated by very cooperative growers willing to share information. The success of this project, and other similar projects that I hope will follow, depends on the cooperation of many more people in the agricultural community.

Eric Sideman
Maine Organic Farmers and Gardeners Association
P.O. Box 2176, Augusta, Maine 04338 (207 622 3118)

I want to thank Jean English and Russell Libby for reviewing the manuscript.

INTRODUCTION

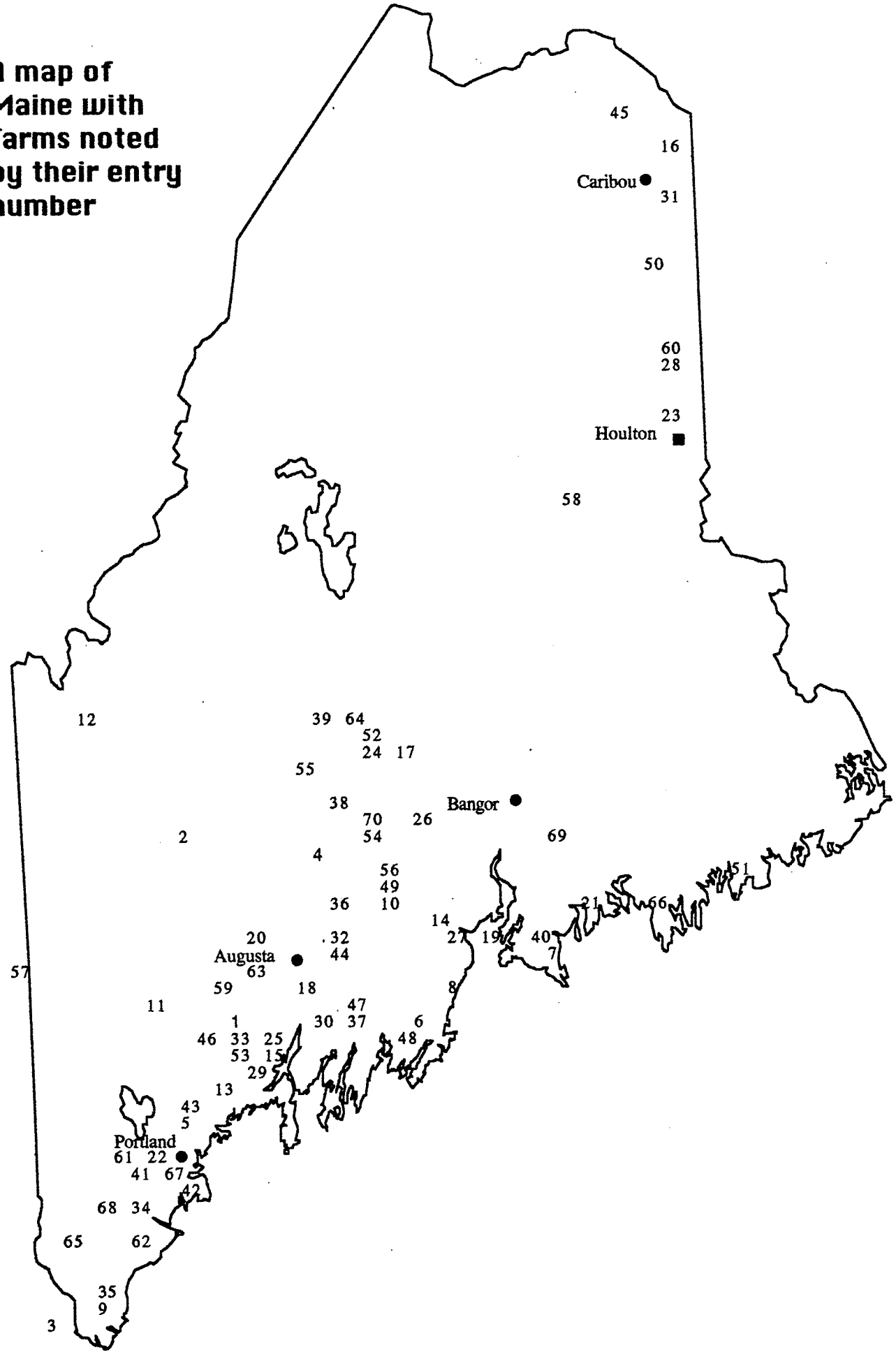
Farmers often raise concerns about issues such as profits, dependence on off-farm inputs, food safety, and degradation of farmland. Many growers are trying to improve their farming operations and have become interested in alternative farming practices. Some farmers have turned to organic production while others have shown interest in incorporating what has been termed sustainable practices into their system.

Those farmers whose farming practices exemplify innovation identify other farmers as their best source of information. Surveys of farmers interested in sustainable practices have identified the lack of useful information as a major impediment to conversion. Clearly, increasing information exchange among farmers will facilitate more awareness of innovative and farm proven practices.

The farmers identified in this directory range from conventional growers with one or two low-input practices of interest to those with diversified and sustainable whole farm systems. Farming practices covered include: soil and water conservation and protection, nitrogen and other nutrient management, manure management, non-chemical weed control, insect and disease control, custom equipment, and alternative marketing. For the most part I have concentrated on vegetable growers, but livestock producers who do an exceptional job of nutrient recycling and soil husbandry through the utilization of vegetable / forage crop rotations are noted.

This is not a how to book. It is a directory to farmers who have some information to offer the farming community. Practices on the farm are only briefly described. The objective of the Directory is to help growers identify other farmers of interest and provide phone numbers and addresses to make contact.

A map of Maine with farms noted by their entry number



Agnew, Jill and Charles

1

Entry number

RFD 2 Box 4105
Sabbatus, ME 04280
Androscoggin
375 6662

tillable acres	6
pasture acres	6
hay acres	5

Jill raises 4.5 acres of MOFGA certified organic mixed vegetables, 1 acre of certified organic raspberries, and operates an IPM apple orchard.

Sheep, work horses, laying chickens and broilers play important roles on Jill's diversified farm -- providing fertility, cultivating, and transporting apple pickers.

Vegetables are marketed through a CSA. Raspberries and apples are sold pick-your-own, from a farm stand and wholesale. Jill and her family make a visit to the farm an experience that is more than getting food. Families connect with the source of their food and enjoy the farm by riding a horse pulled wagon to the picking fields or visiting the animals.

Soil fertility is based on composted manures from the farm's livestock. Rock phosphate and sul-po-mag supply phosphorus and potassium respectively when soil test results indicate deficiencies. Blood meal is sometimes used to side dress crops.

Horse drawn cultivating equipment and hand hoeing are the basis for weed control. The labor demand is met with apprentices through the MOFGA apprentice program. Jill makes sure the apprentice experience is a learning experience for the apprentices, not only a source of labor for the farm.

The major pest is the Colorado potato beetle, which is controled with Bt.

Green manures used in crop rotation provide weed control. A different field is pulled out of vegetable production each season, and buckwheat, clover, hairy vetch, oats or winter rye is grown depending on the major needs of the particular field.

Basile, Bob and Karla Bok

2

Entry number

RFD 1 Box 85
New Sharon, ME 04955
Franklin
778 3903

tillable acres	4
pasture acres	6.5
hay acres	8.5

Bob and Karla grow a wide variety of mixed vegetables, specializing in potatoes, dry beans, and herbs. All the vegetable crops are MOFGA certified organic and are grown in raised beds. In addition to the 4 acres of vegetables and herbs seedlings are raised in a greenhouse.

Some of the produce is sold directly off the farm, but the majority is sold at farmers markets.

Fertility for all the crops is based on manure from the farm's livestock. Blood meal is occasionally used for heavy nitrogen feeders. Bone meal is used to meet early season demand for phosphorus. Sul-po-mag is the chief source of potassium.

Horse drawn cultivation equipment offers good control of weeds. Hand hoeing and pulling does the rest.

Botanical insecticides such as sabadilla are used for insect control. A major pest is the Colorado potato beetle which is controled with the appropriate strain of Bt.

Bob and Karla use crop rotation as part of their weed, insect, and disease control strategy. Vegetables are rotated with oat cover crops from which an early cutting of hay may be taken. For example, a field of dry beans will be followed by mixed vegetables which will be followed by oats. Then back to dry beans.

Batchelder, David

3

Entry number

3 Barker Lane
Stratham, NH 03885
Rockingham
603 778 0970

tillable acres	20
pasture acres	0
hay acres	25

David raises 5 acres of mixed vegetables, one half acre of cut flowers, up to 2 acres of strawberries, 1 acre of pumpkins and 6 acres of sweet corn. All of the vegetables and fruit, except the sweet corn, are certified organic by the New Hampshire Department of Agriculture.

David went through a period of transition from conventional growing methods to organic from 1989 to 1992.

The produce is sold from a well designed farm stand. Flowers and strawberries are also sold pick-your-own. The farm is very picturesque and is set up to heighten the farm vist experience.

The farm fertility is based on crop rotations using legume green manures and composted horse manure from a neighbor farm. Some commercial organic fertilizer is purchased and used on heavy feeding vegetables and strawberries. Conventional fertilizer is used on the hay ground. Sul-po-mag is used for potassium when called for by soil test results.

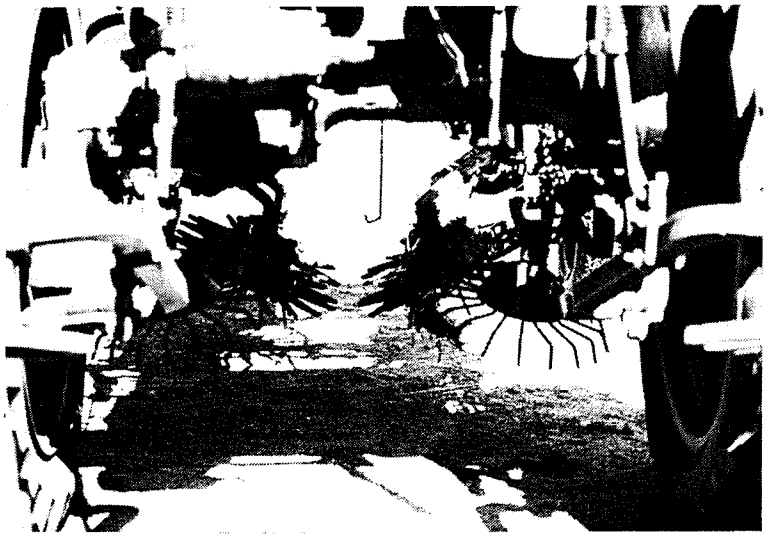
Weed control is primarily achieved with mechanical cultivation. A belly mounted Buddingh Basket Weeder on a Farmall Cub is used in the small crops. A belly mounted finger weeder is used on the strawberries during their first year growth until they start running.

When the corn is 1 inch tall and the growing point is still below ground, Dave passes over the field with a flame weeder.

Crop rotation is the key to the success on David's farm. He counts on legumes such as hairy vetch and clover for soil fertility. Crop rotation also plays an important role for insect, disease, and weed control. All the ground is covered in the fall with either a cover crop or an extended season green manure.

Vegetable and strawberry land is rotated with a hairy vetch/winter rye mix. David harvests his own seed with a neighbor's combine to save for next year's cover crops.

Some land is pulled out of cash crop production to allow winter rye to mature to be harvested for straw. Clover is overseeded into the fall established rye by broadcasting seed onto snow-covered rye fields in March. The clover is left to grow the season after the straw is harvested. Then the land goes back into a cash crop.



Rubber fingers of this belly mounted finger weeder dislodge the young sprouting weeds and can work very close to Dave Batchelder's strawberry plants (see entry 3).

Beaudoin, Roland

4

Entry number

Beaudoin Rd Box 2910
Clinton, ME 04927
Kennebec
426 8131

tillable acres 9
pasture acres 0
hay acres 0

Roland grows 5 acres of strawberries and about 3 acres of sweet corn. He also raises 1 1/2 acres of raspberries, 1/4 acre of blueberries, and a small amount of tomatoes and other vegetables.

All the berries are sold PYO. The corn is sold wholesale.

The basis of fertility on the farm is poultry manure. Roland leases space to a large scale chick producer and the manure is there for Roland's use. He uses aged manure as a side dressing at renovation. Poultry manure is also used in the corn part of the rotation and the corn residue is chopped with a flail mower and plowed in.

Herbicides are used minimumally. The basis of weed control is cultivation with an International single row cultivator on a Ford 8N.

Roland has a rotation with 3-4 years in strawberries and then 3 years in corn.

Beckwith, Donald and Bruce Hincks

5

Entry number

RFD 2 Box 347
Yarmouth, ME 04096
Cumberland
846 4294

tillable acres 15
pasture acres 1
hay acres 0

Don and Bruce raise 3 acres of MOFGA certified organic mixed vegetables and cut flowers, most in permanent raised beds.

Nearly all of the crops are sold at farmers markets.

Fertility is based on homemade compost from a neighbor's horse manure and their own vegetable material. Some blood meal is used for heavy nitrogen feeders in intensive plantings. Bone meal provides phosphorus early in the season. Greensand provides potassium, while rock phosphate is applied to meet long term phosphorus needs. Cover crops are used extensively to conserve nutrients.

Weeding is done by hand, but crop rotation reduces weed pressure.

The major pest is the Colorado potato beetle, for which Bt is used.

Don and Bruce have a complex rotation of vegetables from bed to bed to break disease and insect cycles.

Dave Batchelder overseeds clover into winter rye in the late winter. In the late spring the rye is harvested for straw to mulch the strawberries(see entry 3).

Bellmore, Jeff

6

Entry number

RR 1 Box 689
Warren, ME 04864
Knox
273 3818

tillable acres	100
pasture acres	0
hay acres	0

Jeff raises 15 acres of strawberries and 80 acres of mixed vegetables.

The strawberries are sold mostly pick your own. Some of the berries and the vegetables are sold from their farm stand and the rest are sold wholesale.

Jeff uses a mix of nutrient sources to meet the farm's fertility needs. Good soil management is achieved with cover crops, full season green manures, and crop rotation. Compost is made from hen dressing, mussel shells, old straw and vegetable waste. Some chicken manure is spread directly. Conventional fertilizer is used when needed.

As part of a weed control strategy, crops and/or green manures that compete well with the weeds in particular fields are grown.

Jeff uses a homemade two row cultivator mounted on a three point hitch. Hand hoeing is also an important part of the weed management system. Herbicide use is greatly reduced by integration of these management tools.

Jeff scouts his fields for insects and diseases and is in the IPM program.

There is no set, long term crop rotation plan. Vegetables and strawberries are rotated with green manures. Vegetables are also rotated from field to field as needed to avoid disease and insects.

Birdsall, Paul and Molly

7

Entry number

RFD 1 Box 63
Blue Hill, ME 04614
Hancock
374 5038

tillable acres	30
pasture acres	13
hay acres	20

Paul and Molly raise 7 acres of certified organic vegetables and 2 acres of low bush blueberries.

All of the field work on the Birdsall farm is done with work horses. The Birdsalls also raise sheep.

Most of the produce is sold at a farmer's market. Additional sales are made directly from the farm, and some produce is moved to wholesale markets.

Soil fertility management is based on composted manures from their horses and sheep, and from legume green manures. Rock phosphate, sul-po-mag and wood ash are used to meet requirements identified by soil testing.

The Birdsalls use green manure crops in their crop rotation to handle specific weed problems. Horse drawn cultivation equipment is the basis of weed managment in vegetable fields. Hand hoeing and hand pulling also play an importment role.

Row covers are used to protect crops from root maggots. Bt is used against the Colorado potato beetle.

Vegetable land is regularly pulled out of production for a full season for legume green manures. The Birdsalls commonly use the hairy vetch/winter rye mix or alfalfa. All crop land is covered with winter cover crops after harvest. Early harvested fields are put into forage brassicas (green globe turnips or tyfon) for late fall pasture for the sheep.

Bok, Tony

8

Entry number

P.O. Box 399
Camden, ME 04843
Knox
236 2029

tillable acres	3
pasture acres	25
hay acres	25

Tony grows 3 acres of organic dry beans.

Tony also produces about 50 lambs each season.

The dry beans are sold directly to regular customers, usually in large orders for their winter's storage. The lambs are shipped out wholesale.

A long ley of alfalfa and clover hay in the rotation gives Tony's fields the rest and fertility needed for dry beans. After seven years, the ley is plowed and compost is added to a field. Then rye is seeded for the winter cover and the field goes back into bean production the following season.

The compost is made from municipal leaves that are collected by the town and delivered to Tony's farm for composting with the farm's sheep manure. On-farm composting is done in windrows made and turned with a manure spreader.

Borkowski, Tim and Gail

9

Entry number

57 Gowen Lane
York, ME 03909
York
363 1209

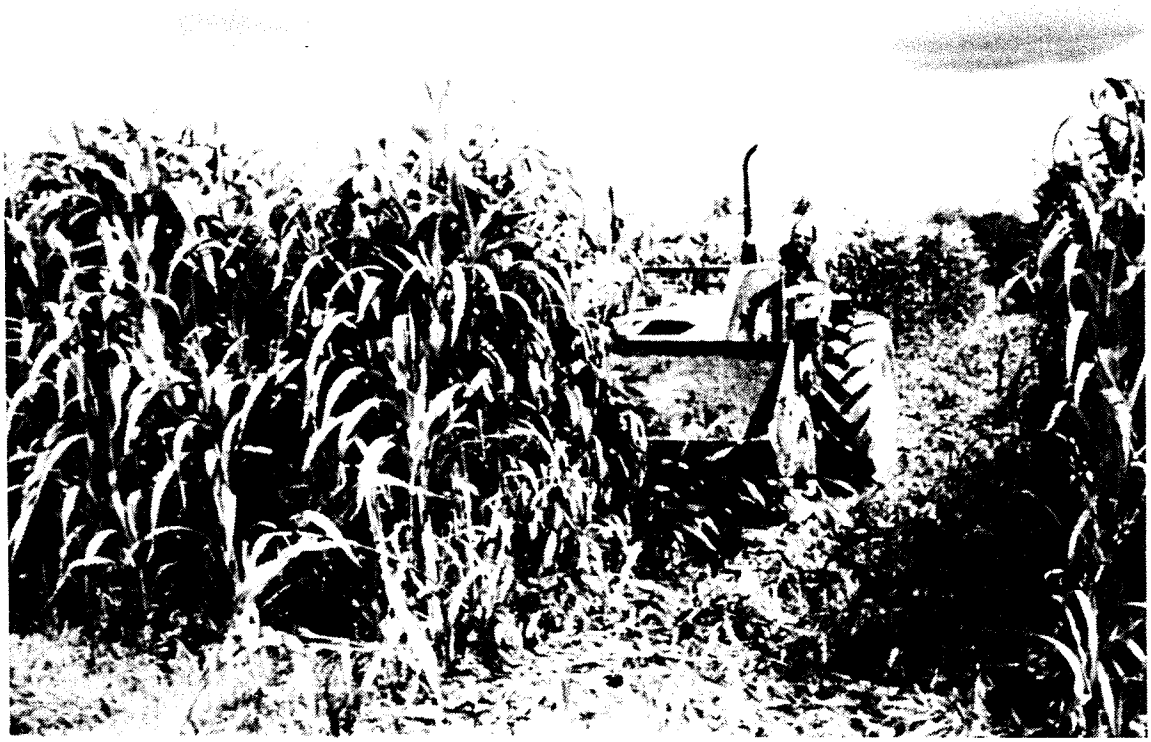
tillable acres	10
pasture acres	6
hay acres	0

Tim and Gail raise 1 acre of organic vegetables plus tomatoes in a hoop house.

The produce is sold directly from their farm stand and at a farmers market.

Soil fertility is maintained with composted manure, seaweed, and legume green manures. Compost is made through sheet composting in the field. Tim uses limited amounts of blood meal, greensand, and bone meal when specific situations call for some extra fertility.

The vegetables are rotated around the acre in a complex arrangement designed to avoid insect and disease problems.



Dave Colson uses sorghum-sudan grass as a cover crop on new land to compete with weeds and add organic matter(see entry 13).

Bowden, Scott

10
Entry number

RR 1 BOx 928
Freedom, ME 04941
Waldo
382 6138

tillable acres	4
pasture acres	3
hay acres	0

Scott raises 3 acres of mixed vegetables. He also grows hoophouse tomatoes, cut flowers and seedlings.

The produce is sold at farmers market or at Scott's farm stand.

Fertility is maintained with legume green manures and compost.

Scott is very experienced with hand operated weed control equipment. He uses a wide variety of hand and wheel hoes.

Insects are controled with a variety of organically acceptable pesticides including botanicals and Bt. Scott also uses beneficial nematodes for soil borne insects.

Scott uses crop rotation to manage soil fertility and control weeds. He follows a set pattern on most fields: heavy feeders follow a legume green manure that was grown the previous season; light feeders (such as root crops) follow the heavy feeders; after light feeders, a competitive cover crop, for example buckwheat, is grown to outcompete on weeds; then the following season the field goes back to a legume green manure.

Carter, David

11
Entry number

Rt 26
Oxford, ME 04270
Oxford
539 4848

tillable acres	10
pasture acres	0
hay acres	0

David grows about 4 acres of mixed vegetables and about 5 or 6 acres of sweet corn.

Nearly all of the produce is sold through an on-site farm store. Other "country" items are sold at the store. The farm is a cross country ski center in the winter and the store becomes a ski shop.

Soil fertility is maintained with hen manure.

Weeds are controlled with cultivating equipment, which is belly mounted on a Farmall Cub tractor. Dave has greatly reduced his use of herbicides by cultivating.

No sprays are used on the sweet corn. Floating row covers are used extensively to protect many crops from pests.

Winter rye is used as a fall cover on the Colson farm(see entry 13).

Casper, Kit and Linda

12

Entry number

Box 392
Rangeley, ME 04970
Franklin
864 5539

tillable acres 2
pasture acres
hay acres

Kit and Linda grow a wide variety of organic vegetables on two acres.

Most of the produce is marketed through their very attractive farm store. They are in a vacation area and they specialize in serving summer residents of their community. Most of their customers depend on them for summer vegetables. Regular customers get special service, e. g., newsletter, privilege to call and reserve products, and more. Customer care, quality products, very attractive layout of produce and a special shopping experience including an educational farm environment create their market base.

The Caspers use homemade compost and legume green manures for most of the fertility on their farm. The compost is made from manure or their lambs, hogs, broilers and layers.

Kit and Linda are committed to keeping a crop of some sort on their tillable land as much as possible. They use short season summer cover crops extensively. For example, they plant oats in each block as each crop is harvested. Winter wheat and rye are used as grains in vegetable rotations. Clover is sometimes used after a crop if the following crop is going to be a late season planting. Oats are often used as living mulch between rows of late crops and are left as a fall cover after the crop is harvested.

Colson, David and Chris

13

Entry number

496 Davis Rd
Duhham, ME 04222
Androscoggin
353 5263

tillable acres 15
pasture acres 0
hay acres 30

Dave and Chris raise about 5 acres of certified organic vegetables. They also have herbs in beds, tomatoes and speciality greens in hoop houses, and 1/2 acre of raspberries. They raise wheat in rotation with the vegetables.

All crops are sold wholesale to restaurants and specialty stores.

Dave uses legume green manures to meet most of his nitrogen needs. He also makes compost from vegetable materials on his farm and manure from his own farm and neighboring farms. He uses bone meal to meet phosphorus needs. He feels the great difference in available phosphorus justifies the increased cost compared to rock phosphate.

Dave does excellent work with mechanical cultivation. Weeds are managed in small crops, such as young spinach or carrots, with a Buddingh Basket Weeder belly mounted on a high clearance Kubota tractor. Larger plants are cultivated with a variety of knives and shovels. Cultivation is simplified by crop rotation with competitive green manures. Dave brought his old fields into production with a series of very competitive green manures, including sorghum sudan grass followed by winter rye.

The basis of insect control on the Colson farm is the crop rotation. Row covers are also used to exclude insects from high value crops. Dave turns to a pyrethrum mix as a last resort for some very tough to handle insects.

The Colson farm is broken into distinct fields, which are planted to vegetable crops, grains, or green manures in rotation. Legumes are used extensively to provide nitrogen. Dave has used red clover as a summer cover, hairy vetch/rye mix as a late summer-late spring crop, and sweet clover. Generally vegetable land is pulled out of production for two years either for green manures or grains with undersown clover.

Cross, Keith

14

Entry number

RR 1
Morril, ME 04952
Waldo
342 5548

tillable acres 32
pasture acres
hay acres

Keith raises 22 acres of sweet corn, 1 acre of potatoes, 2 acres of squash, 1 acre of cabbage, and 6 acres of other vegetables.

He also raises 98 beef animals, 27 hogs, and 18,000 hens.

The produce is sold to stores, restaurants, and coops in nearby cities.

The fertility of the soil is based on livestock manure.

Keth manages weeds with a cultivator mounted on an Allis Chalmers C.

He is in the IPM program.

Dave Colson uses the Buddingh Basket Weeder for fine weed control in a young crop of spinach (see entry 13).

Dennison, Brian

15

Entry number

RR 1 Box 1212
Bowdoinham, ME 04008
Sagadahoc
666 8447

tillable acres 125
pasture acres 0
hay acres 0

Brian raises 38 acres of radish, 25 acres of lettuce, 23 acres of cabbage, 10 acres of beets, 2.5 acres of parsley, and 2 acres of swiss chard. All of the crops are raised in permanent beds separated by tractor wheel tracks. The same beds are kept from year to year, even for green manure crops.

This a large scale wholesale operation. There is a large and efficient packing house where all the vegetables are washed and packed and prepared for shipping. Almost all of the produce goes to large supermarket chains in New England.

Brian uses compost and green manures to meet the fertility needs of his crops. Conventional fertilizers are banded for better placement and efficient plant uptake.

Herbicide use on the farm is greatly reduced. More than half of the crops are raised with no herbicide. Good crop rotation and use of competitive green manures in the off years reduce the weed pressure. Excellent use of state-of-the-art cultivating equipment is key to the success of the operation. The early cultivation is done with a Buddingh rolling basket weeder. The second cultivation combines the basket cultivater and Bezzerides springhoes or torsion weeders. In some crops the third cultivation is hilling with Bezzerides Spyders.

Most crops are not planted in the same bed for three years. Only radishes are repeated for a few years. Frequently fields are pulled out of cash crop production and planted to a green manure. The needs of the particular field drive Brian's choice of green manures. For nitrogen fixation Brian chooses red clover,vetch or vetch/rye mix. For soil conditioning or adding organic matter he uses Japanese millet, sorghum sudan grass, or oats. Brian is very committed to fall cover cropping with rye or vetch/rye mixes. Even the latest fields are planted to a cover crop after harvest.

Devoe, Arthur and Tom

16

Entry number

RFD 1 Box 48
Limestone, ME 04750
Aroostook
325 4550

tillable acres	180
pasture acres	20
hay acres	40

The Devoes raise 80 acres of potatoes and 60 acres of small grains, including triticale.

They keep 20 head of beef.

The key to fertility on the Devoe farm is crop rotation with legumes. They also use the manure from their beef animals, spreading it before the grain crops in their rotation.

Very little herbicide is used. Primary weed control is with a belly mounted cultivator on a John Deere. This year they used only 25% of the recommended herbicide.

The Devoes are a trial site for the new variety of genetically engineered potatoes, developed by Hybertech, that contain a gene for the Bt toxin.

They farm following a four year rotation: 2 years of potatoes, then a year of grain, then a year of a legume pasture mix (red clover, alsike clover, and timothy).

Dorman, John

17

Entry number

RFD 1 Box 20
Exeter, ME 04435
Penobscot
278 4800

tillable acres	450
pasture acres	0
hay acres	0

John raises approximatly 450 acres of potatoes.

All the potatoes are wholesale marketed.

Conventional fertilizer needs are greatly reduced by rotating crops with a neighboring dairy farm (see Fogler). Crop rotation with legumes provides nitrogen. Cow manure is applied when the dairy farmer grows corn. The corn is overseeded with annual ryegrass at the last cultivation time, which helps conserve nutrients, prevents leaching , and establishes a fall cover crop.

The rotation with the forage crops for the dairy breaks the potato insect cycles.

Crop land is shared with the Fogler dairy farm (see Entry #24). The rotation includes Dorman's potatoes, and then barley, alfalfa and corn for the dairy feed.

Brian Dennison uses a belly mounted Buddingh Basket Weeder on an Allis Chalmers "G". The wheel tracks between the beds are maintained from year to year, which means the soil in the beds is never compacted (see entry 15).

Douglass, Rudd and Elizabeth
RFD 2 Box 374
Gardiner, ME 04345
Kennebec
737 8522

18
Entry number

tillable acres	23
pasture acres	6
hay acres	0

Rudd grows 1 acre of potatoes mostly sold as new potatoes, 1 acre of sweet corn, 1 acre of tomatoes and peppers, 1 acre of squash and melons, and 7 acres of other vegetables. In addition, Rudd raises 22 acres of low bush, wild blueberries. All of the vegetables and most of the blueberries are certified organic.

Elizabeth sells eggs from 500 layers.

Most of the produce is sold at farmers' markets. They also market to speciality stores and some direct from the farm.

Soil fertility is based on compost made from the chicken manure. Nutrients are supplemented with cottonseed meal, sul-po-mag, rock phosphate and alfalfa pellets.

Bt is used for Colorado potato beetle. Row covers are use to protect crops from cucumber beetle. Botanicals are used as a last resort.

Eggert, Frank

RR 2 Box 365
Verona, ME 04416
Hancock
469 7519

19
Entry number

tillable acres	1/2
pasture acres	2
hay acres	3

Frank and Barbara raise a mix of organic vegetables and small fruit.

They raise a small number of sheep for quality fleece.

The extra produce is sold through a farm stand.

Frank has designed a crop rotation with legumes to meet most of the nitrogen needs. Compost is made from the farm livestock manure and meets the rest of the needs.

Different gardens are pulled out of production for a season or more to plant legumes. Cover crops are used to prevent erosion. Legumes are frequently overseeded into sweet corn for winter cover and for the next season's green manure.

The Devoes raise beef in addition to potatoes, which gives them great opportunities for crop rotations and a means to recycle nutrients on the farm (see entry 16).

Elvin, Eric

20
Entry number

Pea Ridge Rd
Readfield Depot, ME 04355
Kennebec
685 4285

tillable acres	40
pasture acres	0
hay acres	0

Eric and his family raise 25 acres of sweet corn, 7 acres of pumkins, 3 acres of strawberries, and 3 acres of other mixed vegetables. They also operate a greenhouse where they raise seedling and bedding plants.

The produce is sold off the farm and from a seasonal farm stand set up on a major road.

The major source of crop nutrients is chicken manure.

Eric is noted for his proficiencey with cultivating equipment. He uses Lilliston rolling cultivators for corn and other large crops. The spring tooth harrow is used on many fields. Eric, at an Extension Field Day at his farm, pointed to the wheel hoe and said it is his most important weed control tool.

Eric scouts for insects and uses IPM in his sweet corn.

Ernst, Kevin and Lisa
Conway
HCR 62 Box 307
Mt. Desert, ME 04660
Hancock
244 5204

21
Entry number

tillable acres	10
pasture acres	5
hay acres	0

Kevin and Lisa grow 3 acres of MOFGA certified organic vegetables, with an emphasis on speciality lettuce.

Nearly all of the produce is sold from their farm stand. A small amount is sold to local restaurants and specialty stores.

The heart of the fertility program is compost made from leaves brought to the farm from the community. Manure from local livestock and farm wastes are added to the pile. The pile is turned using a PTO driven manure spreader.

Additional nitrogen is added to the system through the extensive use of legume green manures. Some crops are side dressed with blood meal.

Crop rotation and the use of green manures is key to managing weeds. Kevin also relies on various kinds of cultivating equipment such as a Buddingh basket weeder.

Crop rotation is at the heart of insect control. Bt is used for Colorado potato beetles. Kevin turns to botanicals as a last resort.

The vegetables are raised on well separated fields, which are put into green manures in rotation after two years of crops. Depending on the needs of the field, buckwheat or a legume is grown.

Kevin Ernst uses dutch white clover as a living mulch between rows of squash (see entry 21).

Estes, Carl

22
Entry number

RR 3 Bx 89
Gorham, ME 04038
Cumberland
929 4801

tillable acres	15
pasture acres	0
hay acres	25

Carl used to raise 6 acres of strawberries, but now he is retired. He still raises a half acre of strawberries, 2-3 acres of melons, a quarter acre of pumpkins and about 7 acres of high bush blueberries.

The strawberries are sold PYO mostly to friends and neighbors. The melons are sold to other farm stands.

Carl uses green manures in rotation with crops to build soil structure and control weeds. Vegetable land is taken out of production and put into rye, oats or Japanese millet for two years.

Fitzpatric, Don

23
Entry number

Jordon Rd.
Houlton, ME 04730
Aroostook
532 6015

tillable acres	500
pasture acres	0
hay acres	0

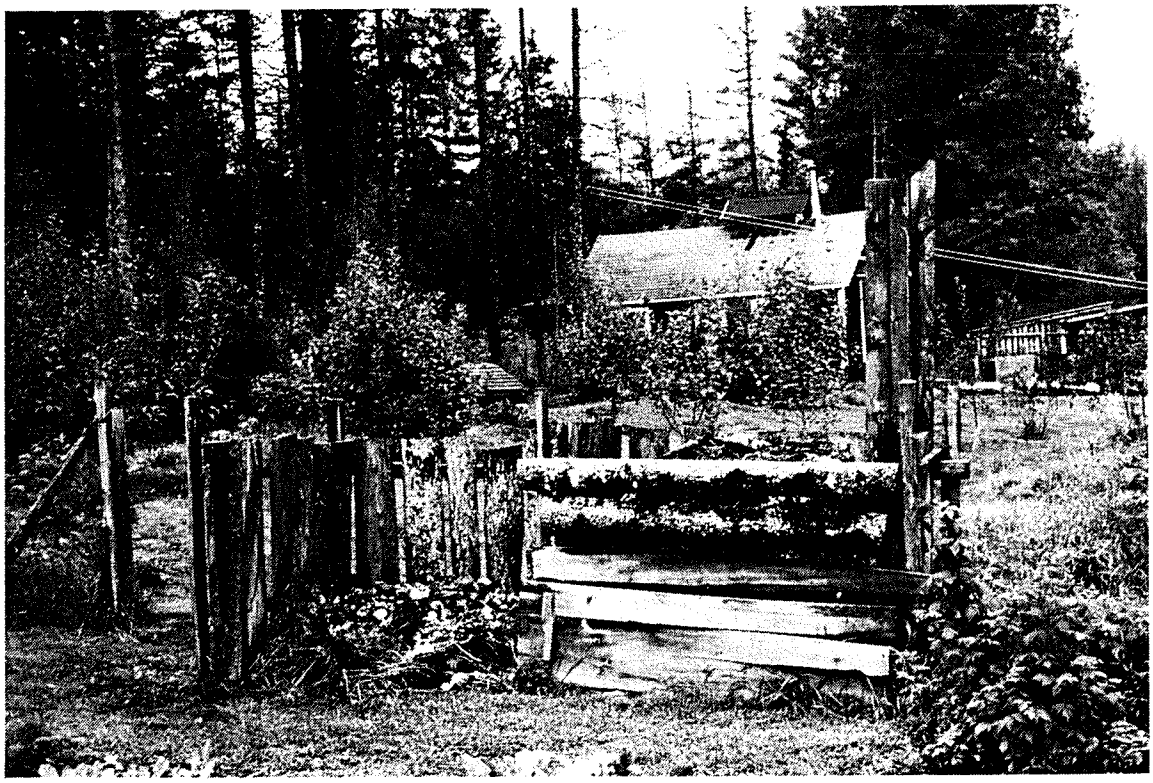
Don grows 340 acres of seed potatoes.

Almost all of the seed is sold to wholesale markets.

Legume crops grown in rotation with the potatoes reduce the amount of conventional fertilizer needed.

Don uses a home-built flamer to help control the Colorado potato beetle.

He uses a rotation with grains and legumes to condition the soil. He rotates out of potatoes after one year production and plants barley with undersown red clover. The clover is kept a year after the grain harvest. Because of its great soil building qualities, Don chooses to plow the straw in rather than harvest it.



Kit and Lind Casper base most of their crop nutrition on compost made at the farm(see entry 12).

Fogler, Bob

24

Entry number

RFD 1 Box 1900
Exeter, ME 04435
Penobscot
379 2428

tillable acres	600
pasture acres	
hay acres	250

The Foglers operate a dairy farm. They are noted in this directory because of their arrangement with a near-by potato grower. The Foglers raise about 300 acres of field corn, 300 acres of barley, and 125 acres of alfalfa in a rotation with John Dorman's potatoes.

They are milking about 225 cows and have about 200 heifers.

Fertility is based on a mix of manure, legumes in rotation, and conventional fertilizer.

The field corn is cultivited with a row crop field cultivator. This practice breaks up crusty soil and reduces the need for herbicides.

The rotation provides a good use for the excess manure produced on the dairy farm. After a year of potatoes, barley is planted with undersown alfalfa. Corn comes in next and receives the manure applications. Annual ryegrass is overseeded in the corn after the last cultivation. The ryegrass prevents leaching, helps build the soil, and remains as a fall cover crop after the corn is harvested.

Friedman, Ed

25

Entry number

RFD 1 Box 1186
Bowdoinham, ME 04008
Sagadahoc
666 3725

tillable acres	2
pasture acres	0
hay acres	0

Ed concentrates on growing leeks, basil, giant pumpkins, and hot peppers. The produce is certified organic.

All the crops are sold to restaurants and specialty food stores. The pumpkins are marketed to downtown stores at Halloween time as store front displays.

The basis of fertility is crop rotation with legume green manures. Animal manures, leaves, and a fish hydrolysate provide additional nutrients.

Whole fields are pulled out of production for a season and green manures are used for improving soil tilth, controlling weeds, and adding nitrogen. Ed has experience growing crimson clover, red clover, rye, buckwheat, and sweet clover.

The Foglers overseed annual rye into their corn after the last cultivation, which leaves an established fall cover crop when the corn is harvested to catch left over nutrients(see entry 24).

Frost, Freeman

RFD 1 Box 386
Carmel, ME 04419
Penobscot
848 3888

26
Entry number

tillable acres	25
pasture acres	0
hay acres	0

Freeman raises 20 to 25 acres of many kinds of vegetables. In addition to field-grown crops, he does an excellent job of growing early tomatoes and cucumbers in hoop houses.

Most of the crops are sold directly from the farm out of a farm store.

Weed control is handled almost entirely with crop rotation and mechanical cultivation. Periodically fields are pulled out of production and a competitive green manure is planted for a season.

A Danish tine cultivator on a three point hitch provides most of their weed control. A spring tooth cultivator is also used, especially for getting out quack grass. A harrow with a beam dragged behind it is used to "float" the field. Herbicides are used only on carrots and potatoes.

All the land is covered with cereal rye for the winter. Periodically Japanese millet or buckwheat is used as a green manure on land pulled of production. All the residue from crops and green manures is plowed back into the soil. When a piece of ground seems in need, Freeman may pull it out of vegetable production and grow hay on it for a while. He says, " this is the best way to build the soil."

Galland, Nancy and Richard
Standard
RFD 1 Box 656
Belfast, ME 04915
Waldo
338 3568

27
Entry number

tillable acres	3
pasture acres	0
hay acres	0

They grow a wide variety of organic vegetables and hoop house tomatoes. Nancy and Richard have cut way back on their production as they get ready to retire.

Most of the produce is now marketed directly from the farm on a farm stand. They also have a great deal of past experience marketing to specialty stores and going to farmer markets.

The basis of the fertility is home made compost made from cow manure, horse manure, kitchen wastes, garden wastes, etc. Fertility is supplemented with sul-po-mag, epsom salts, seaweed, fish liquid fertilizer and worm castings.

Quack grass is controled by chisel plowing and raking off.

Green manures are used as in-season cover crops as part of the rotation. Oats are often overseeded into vegetable fields in order to establish a fall cover crop early.

Freeman Frost handles weeds almost entirely with mechanical cultivation (see entry 26).

Gerritsen, Jim and Megan

28

Entry number

RFD 1 Box 164
Bridgewater, ME 04735
Aroostook
429 9765

tillable acres	10
pasture acres	10
hay acres	8

Jim and Megan grow 7 acres of certified organic table and seed potatoes and 3 acres of certified organic mixed vegetables. They emphasize specialty potatoes and hard to find varieties.

They sell about 15 lambs a year. Jim and Megan also keep work horses.

Jim and Megan have established a mail order catalog for much of their produce. They also do some marketing on a wholesale level and have experience with a CSA.

Fertility is based on a variety of sources of nutrients. Legume green manures are used extensively in rotation with cash crops. Fish wastes (fish scale, fish meal, crab meal, etc.) are used as concentrated nitrogen sources. Manure tea and compost are used frequently.

Weeds are controled through good crop rotation and mechanical cultivation.

Colorado potato beetle is the major insect pest. Good control is obtained with a combination of methods. A flamer is used early in the season to get the first adults. Also, a trench trap is built to capture adults coming out of hibernation crawling to reach the new potato fields. Bt is used later to get larvae.

Compost teas are used as a sprays to control late blight on potato.

The rotation Jim and Megan use begins with potatoes or vegetables, then a grain is undersown with clover, then the clover or clover timothy mix is allowed to grow a season or more, then potatoes or vegetables are planted again.

They have experience with growing a variety of clovers including medium red, alsike, and yellow sweet clover.

Gill, Chas

29

Entry number

RR 1 Box 1223
Bowdoinham, ME 04008
Sagadahoc
666 3116

tillable acres	12
pasture acres	0
hay acres	0

Chas and Linda grow 8 acres of field grown flowers and herbs plus early flowers in hoop houses.

Almost all of the produce is marketed through farmers markets.

Green manures and compost are the heart of the fertility program. Supplemental nutrient needs are met with bloodmeal, bonemeal, sul-po-mag, and fish emulsion.

Most of the crops are raised on raised beds made with a tractor mounted bed former, which lays black plastic with a drip line under it. Crop rotation including competitive green manures play an important role in weed control.

Chas has experience with controlling flower insect pests with botanicals such as sabadilla.

After cropping a field for a few years, winter rye is planted in the fall. Then the field is kept out of cash crop production for two years while green manures are grown. Chas has experience with buckwheat, hairy vetch, clovers, millet, and oats.

The Gerritsens use a trench to trap the first Colorado potato beetles walking in search of the new potato field (see entry 28).

Goranson, Jan and Rob Johanson
RR 1 Box 890
Dresden, ME 04342
Lincoln
737 8834

30
Entry number

tillable acres	30
pasture acres	0
hay acres	0

Jan and Rob grow 12 acres of tablestock potatoes, 7 acres of sweet corn, 1 acre of asparagus, 2 acres of squash and pumpkins, and 9 acres of a good mix of other vegetables, flowers, and herbs. They also raise about a half an acre of strawberries, and a 100 foot greenhouse full of extra early tomatoes.

Each year they raise 12 pigs and about 250 broilers.

They sell much of their produce from their own farm stand. They also sell to restaurants and through farmers markets. They market a great deal of their potatoes in storage quantities to long standing, regular customers.

They reduce their need for commercial fertilizer by using legumes in their crop rotation.

Mechanical cultivation is the basis of weed control. Rob uses an Allis Chalmers G with belly mounted cultivators. He also uses Lilliston rolling cultivators in the corn and potatoes. The first hilling of potatoes is done with these.

Their crop rotation plays an important role in weed control.

They are in the IPM program for sweet corn. Spraying is a minimum in all crops. Bt is used when possible instead of chemical pesticides.

They use a variety of crop rotations in different fields. The potato rotation that Rob is trying to get into is potatoes for a year, then the vetch/rye mix, then corn, then back to potatoes. As much land is cover cropped as possible. Periodically the rye is left to grow, then tilled, and rye/vetch is planted and left until the next season, then the field goes back into production.

Goughan, Mark and Gloria

Fort Fairfield Rd
Caribou, ME 04736
Aroostook
498 6565

31
Entry number

tillable acres	30
pasture acres	0
hay acres	0

Mark and Gloria grow 15-20 acres of strawberries and 5-6 acres of mixed vegetables. They also produce 5 acres of pumpkins, and early tomatoes in a greenhouse.

They sell most of the produce off their farm stand. The berries are PYO. Mark has a great flare for marketing. The farm stand has a lunch counter from which they move much of their own products. Their maple syrup house is set up like a class room for educational tours from school groups. The farm stand is surrounded by beautiful gardens and paths. A barn full of a wide variety of animals is kept just to make a visit to the farm a memorable experience for the whole family.

Mark handles most of his weed problems with mechanical cultivation equipment. He uses a field cultivator set for weeds between rows in strawberries. He has built a mechanical cultivator that is tractor mounted and is operated by a rider who maneauvers handles that guide two shanks around the plants in the row.

Greager, Jamie and Martie Crone
RT 1 Box 725
Palermo, ME 04354
Waldo
993 2755

32
Entry number

tillable acres 1
pasture acres
hay acres

Jamie and Martie grow a quarter acre of certified organic garlic and about a half acre of certified organic vegetables.

A major chunk of their produce is sold at the Common Ground Fair. The rest is sold to specialty stores.

Nutrient needs are met with compost. Some of the compost is bought from a commercial source.

Jamie and Martie grow the garlic in rotation with a green manure, usually buckwheat.

Gross, Frank

Box 141
Lisbon, ME 04250
Androscoggin
353 6891

33
Entry number

tillable acres 3
pasture acres 0
hay acres 0

Frank raises 2 acres of certified organic mixed vegetables. He specializes in a wide variety of salad greens and salad mixes including edible flowers. Much of his production is continued late into the season by means of specially designed greenhouses. One house is kept in production year round. It has double layer plastic walls built around custom made steel separating bows. The house is heated with a wood stove.

Frank's field production is in raised beds.

Frank is a restaurant trained specialty salad preparer. He sells most of his produce as prepared salads and steamer-ready vegetables to a very high class restaurant that is committed to local and organic food whenever possible.

Most of the fertility needs are met with composted cow manure. He supplements with blood meal, rock phosphate, and fish hydrolysate. Frank also uses legume green manures.

Rob Johanson discusses the day's results with an IPM scout on the Goranson/Johanson farm(see entry 30

Harris, William

34

Entry number

RFD 3
Biddeford, ME 04005
York
499 2678

tillable acres	80
pasture acres	40
hay acres	250

The Harris family raises 4 acres of mixed vegetables, 20 acres of sweet corn, and hoop house tomatoes. They also operate a dairy farm where they are milking about 45 cows. They use 55 acres for silage corn and alfalfa and raise 250 acres of hay. The hay is a grass/legume mix. Much of the hay is sold. Bill uses a no-till planter to seed legume into the hay.

The crops are raised on a wide variety of sources of fertility. The vegetables receive mostly conventional fertilizer. The corn is in a rotation with legume. The Harrises make good use of recycled and waste stream sources of nutrients. They have experience with using municipal sludge, N-Viro soil, and commercial ash.

The corn is in rotation with alfalfa. After 5 years of corn, Bill grows alfalfa for 5 years. Although most of the silage comes off too late to cover crop, Bill succeeds in getting the ground covered by overseeding the corn, including sweet corn, with rye when about foot tall.

Hayes, Barry and Susan

35

Entry number

76 Picott Rd
Kittery, ME ?
York
439 6522

tillable acres	1
pasture acres	0
hay acres	4

Barry and Susan grow about an acre of MOFGA certified organic vegetables and a small amount of raspberries.

Most of the crops are sold to a large produce stand and a healthfood store. The potatoes are raised for seed and sold to a local seed company as certified organic potato seed.

The fertility is based on composted manure. They also use rock phosphate, blood meal, and some seaweed.

Barry uses Dutch white clover as a living mulch between rows of raspberries.

Although no land is pulled out of production for a season because of the small land base, they cover fields and parts of fields as crops come off. The rye cover crops are frequently fed the their sheep.

Frank is telling us about his salad mixes(see entry 33).

Johnston, Rob (Johnny's Selected Seeds)
Foss Hill Rd
Albion, ME 04910
Kennebec
437 9294

36
Entry number

tillable acres	30
pasture acres	0
hay acres	0

They grow 30 acres of mixed vegetables for research and seed production.

The fertility is based on composted cow, chicken, and horse manure brought from neighboring livestock farms.

Weed control is chiefly by means of mechanical cultivation equipment. They use a home made field cultivator, Liley spring tines, and belly mounted traditional cultivators.

Three different tractors are used for cultivating: an Allis Chalmers G, a Farmall 200, and a Farmall AV. The Farmall AV is a high clearance Farmall A that is able to straddle plastic tunnels or other row covers. The Allis Chalmers is run with the cultivators made for that tractor. The Farmalls are used with belly mounted spring tines set to do 2 rows or one side of plastic mulch.

In addition to mechanical weed control, Rob has vast experience with wheel hoes and a wide variety of hand hoes.

Rob has very few pest problems because of his commitment to crop rotation. They use floating row covers to exclude pests such as cabbage maggots. Botanicals are used only as a last resort when cucumber beetles or flea beetles get bad. Colorado potato beetle is controled with Bt.

Crop rotation is designed to manage pests, diseases, soil fertility, and to rest ground. Fields are regularly taken out of production and green manures planted. Examples of crop rotations include growing grains on vegetable land. Mammoth red clover is undersown in the grain and is left after the grain is harvested to grow another year. They report very good weed control by taking a field out of production and planting the oat, pea, vetch mix that is being studied at the University of Maine. This mix gives much better weed control than a straight clover cover.

Jones, Bambi and David (Tracy) Moskovitz
Hollywood Blvd.
Alna, ME 04535
Lincoln
586 5837

37
Entry number

tillable acres	15
pasture acres	1
hay acres	10

Bambi raises 4 acres of mixed, MOFGA certified organic vegetables.

They raise 2 beef cows, about 150 broilers, and 14 pigs.

The vegetables are sold at farmers markets, restaurants. In addition, Bambi has a CSA.

Fertility is based on compost and green manures.

They use wheel hoes and hand hoes for managing weeds.

Bambi has experience with botanicals, floating row covers, Bt, and predator release.

There is a 7 year plan where vegetables are rotated and periodically land is pulled out of production to grow green manures. The rye/vetch mix is used for winter cover and early spring growth. Summer covers include buckwheat, and clovers. Bambi also interseeds soybeans between her rows of sweet corn. She frequently uses dwarf white clover as a living mulch between cole crops and squash.

Jones, Priscilla

38
Entry number

RR 3 Box 280
Newport, ME 04953
Penobscot
938 2497

tillable acres	8
pasture acres	3
hay acres	0

Priscilla concentrates on the 1 to 2 acres of certified organic strawberries, but also grows an acre of peas, new potatoes, and dry beans.

She sells the produce to local stores. Some of it goes directly from the farm and some to vendors at the Common Ground Fair.

The crop rotation with green manures and the widely separated fields are the key to managing strawberry pests.

Crop nutrition at Johnny's Selected Seeds is based on compost. The piles are built and turned using a manure spreader, and kept covered to prevent leaching (see entry 36).

Kafka, Jason and Barbara

39
Entry number

RFD 1 Box 263
Guilford, ME 0443
Piscataquis
277 3114

tillable acres	38
pasture acres	20
hay acres	40

Jason and Barbara raise 3 acres of certified organic mixed vegetables and a half acre of dent corn for animal feed.

They raise about 5 whiteface beef cows.

Much of their marketing is at the Common Ground Country Fair. They also market to local outlets.

Jason uses compost, a fish hydrolysate, sul-po-mag, and commercially produced wood ash.

Jason uses Bt for potato beetles. He also has experience with botanicals such as rotenone.

Jason is still developing a rotation plan as he opens new ground to bring into production. He uses winter rye, then buckwheat, and then soybeans or oats initially on new fields before crops. The rotation Jason is aiming for is potatoes followed by beans, followed by mixed vegetables and then a green manure.

King, Dennis

40

Entry number

HCR 80
Penobscot, ME 04476
Hancock
326 9701

tillable acres	30
pasture acres	10
hay acres	30

Dennis grows 3 acres of certified organic vegetables.

He markets about 50 lambs a year.

Most of the sales are to local stores and restaurants.

Fertility is based on compost and legume green manures. Dennis takes fields out of cash crop production and puts legumes in for 2-3 years. Sheep manure is composted in a building connected to the greenhouse, which is designed so the heat is used to heat the greenhouse. Dennis uses Sul-po-mag and rock phosphate as supplemental sources of nutrients when soil tests indicate needs.

Crop rotation plays an important role in managing weeds, but Dennis's excellent weed control in vegetable fields depends on his finesse with cultivation equipment. The small vegetables are set in 3 rows 6 inches apart in beds 36 inches apart. Dennis uses a Buddingh basket weeder belly mounted on an Allis Chalmers G when the plants are shorter than an inch. For taller plants and larger crops such as corn, potatoes, and beans he turns to Bezzerides spiders.

Dennis uses botanical insecticides if needed. He also has experience with Bt for Colorado potato beetle.

He rotates his vegetables with green manures and small grains. A common rotation on his farm is vegetables for 3 years, then wheat undersown with alfalfa. Alfalfa is left for a few years after wheat harvest, then the field is put back to vegetables. He will sometimes cut hay from the alfalfa or pasture livestock. Lately, Dennis has turned to an alfalfa/orchard grass mix because it is more competitive with weeds than alfalfa alone. Dennis also uses vegetable land to produce various kinds of tempory pasture such as season extending brassicas.

MacLoed, Bob and Elaine

41

Entry number

RR 1 Box 183
Hollis CTR, ME 04042
Cumberland
247 5439

tillable acres	2
pasture acres	0
hay acres	0

Bob raises about 1.25 acres of certified organic vegetables.

All the crops are sold at farmers market.

The farm's fertility is based on compost. Bob supplements with fish hydrolysate.

Insects are controled with Bt and botanicals when necessary.

Vegetables are rotated around the fields and between two main fields.

Dennis King makes use of his legume rotation crops for feeding his livestock (see entry 40).

Maxwell, Ken

42

Entry number

112 Spuerwink Ave
Cape Elizabeth, ME 04107
Cumberland
799 2940

tillable acres	100
pasture acres	0
hay acres	0

Ken and his family raise mixed vegetables on 90 acres and strawberries on 11 to 12 acres

They are experts in marketing produce to their local community. His son and son's wife manage the farm store on a main road in town through which most of the crops are moved. Some of the strawberries are picked by local highschool kids for sale, the rest is sold PYO.

Weed control is handled with a mix of implements. Very little herbicide is used. They have an offset Ford tractor on which they mount a Buddingh basket weeder for cultivating in small crops. Larger crops are cultivated with a Buddingh finger weeder mounted on the Ford or an Allis Chalmers G. They also use Lilliston spiders mounted up front on the offset Ford. Herbicides are used only on some problem crops, and even there are skipped in years when they are not needed, such as the year after a competitive green manure.

Ken is in the IPM program.

The strawberries are rotated with vegetables and rye cover crops. After picking berries for three years rye is planted for winter cover. The following year vegetables are grown, then a rye cover and in the spring back to strawberries.

Merrill, Sally

43

Entry number

42 Winn Rd.
Cumberland, ME 04021
Cumberland
829 5574

tillable acres	20
pasture acres	20
hay acres	20

Sally raises 3 acres of sweet corn and 14 acres of field corn.

She produces 70 polled Hereford cows and about 75 Dorset sheep.

Sally sells her products off her road side stand. The field corn is for her cattle.

The farms' fertility is based on the livestock manure.

She uses IPM for pest control in the corn.

The corn ground is in rotation with alfalfa hay. Before going back to corn she uses winter rye for a cover crop.

Cultivation is the first line of weed control on the Maxwell farm. A belly mounted finger weeder on an off-set Ford tractor cleans this crop (see entry 42).

Miller, Bonnie and Mark
(Shawn Keenan)
RR 1 Box 1886
Coopers Mills, ME 04341
Lincoln
549 7802

44
Entry number

tillable acres	30
pasture acres	0
hay acres	10

Bonnie and Mark have recently made a major switch in the emphasis of their farm. In the past it was centered around the production of mixed vegetables and sheep. Now they raise about 4 acres of certified organic strawberries and 3.5 acres of certified organic wheat and hay in rotation.

The strawberries are mostly sold PYO but some are picked and sold wholesale. The wheat is primarily sold to food vendors at the Common Ground Fair.

The fertility is based on rotations with legume green manures. Other sources of nutrients include sul-po-mag, fish hydrolysate, and the straw mulch used on the strawberries.

Excellent weed control is attained by cultivation. In both the small grain and the strawberries Mark uses a Lely spring tine weeder. The Lely is used in the strawberries the planting year before the plants send runners. It is only effective with very small weeds so timing is crucial. Mark also use cultivating sweeps belly mounted on a high clearance tractor.

The short rotation and large distance between fields are key to pest control in strawberries.

They pick strawberries only one year. Mark has experimented with a number of different rotation crops and has experience growing a wide range of green manures including rye, oats, various clovers, buckwheat, etc. The rotation they settled on is strawberries followed by wheat followed by a legume hay for at least two more years before going back to strawberries. They overseed the legume hay at the time of the last Lely cultivation in the wheat. This establishes the cover crop and yet the clover is not too tall to interfere with the combine when harvesting the wheat.

Miller, Stephen and Barbara
RR 1 Box 125
Stockholm, ME 04783
Aroostook
896 5860

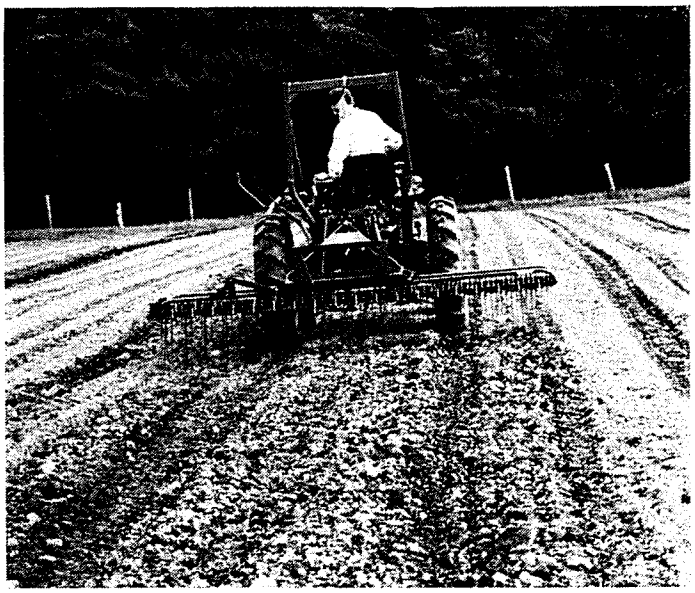
45
Entry number

tillable acres	5
pasture acres	10
hay acres	0

Stephen and Barbara have cut back on their production but are knowledgeable growers of organic vegetables. They still grow a half of acre of certified organic garlic, a little bit of certified organic strawberries, raspberries, and blueberries.

They do some local marketing and sell in the farmers market at the Common Ground Fair.

Fertility is based on home made compost, potato waste compost, and legume green manures. Nutrients are also added as fish scales and foliar fish mixes.



Mark Miller has demonstrated excellent weed control in strawberries with a Lely Springtine(see entry 44).

Mireault, David

46

Entry number

859 S. Witham St.
Auburn, ME 04210
Androscoggin
786 3685

tillable acres	1
pasture acres	0
hay acres	0

David raises 1 acre of MOFGA certified organic vegetables concentrating on greens.

David's major market is local restaurants. He also sells at a farmers market.

Soil fertility is based on composted manure, ground leaves, and leaf mold. Nutrients are supplemented with wood ash, fish hydrolysate, and manure tea.

David has experience using Bt for potato beetle and botanical insecticides for a variety of pests. He also uses floating row covers to protect crops.

Moore, Austin

47

Entry number

RFD 1 Box 14
N. Whitefield, ME 04353
Kennebec
549 7165

tillable acres	10
pasture acres	40
hay acres	75

Austin has been adding more and more crops now that he has pulled out of dairy production. The last time I talked to him, he had 4 acres of small grains that he has ground into flour or cereal mixes. He raises 2 acres of dry beans, 1 acre of potatoes, 1to 2 acres of sweet corn and about an acre of other vegetables and strawberries.

Until recently he milked about 50 cows. The last couple of years he was milking Jerseys on a seasonal basis to take the greatest advantage of pasture production and have the least dependence on concentrates. He was feeding very little grain --mostly Maine barley. He has in-depth experience with rational grazing and pasture maintenance.

The crops are sold directly from the farm.

For the most part Austin depends on farm scale composting. He pays a great deal of attention to soil fertility and has experience with alternative methods of maintaining soil nutrient levels, especially micronutrients.

Austin periodically pulls fields out of crop production to put into a green manure such as buckwheat or a legume. All the fields are covered, usually with winter rye for the fall/winter. Fields are rarely planted to the same crop two years in a row.

Austin Moore looks across the fence to the next paddock in his rational grazing system (see entry 47).

Moore, Gregory

48

Entry number

HC 68 Box 196 B
Cushing, ME
Knox
354 2435

tillable acres	4
pasture acres	0
hay acres	0

Gregory raises 2 acres of MOFGA certified organic mixed vegetables and perennial and annual cut flowers.

He markets to local restaurants and directly from his farm stand.

Fertility is based on composted chicken and horse manure from local farms and crop rotation with clovers and alfalfa. Supplemental nutrients are derived from a wide variety of sources, including rock phosphate for long term phosphorus needs and bone meal for a quicker source, sul-po-mag for potassium, foliar-applied fish, dried blood, cottonseed meal, and wood ash.

Gregory has a well planned, 9-year rotation through his fields, which are divided to suit the rotation. The sequence begins with a green manure followed by potatoes, squash, corn, root crops, peas and beans, garlic, leafy greens, and then flowers.

Neves, Tony

49

Entry number

RFD Box 62
Freedom, ME 04941
Waldo
382 6137

tillable acres	30
pasture acres	0
hay acres	60

Tony raises 15 acres of dry beans and a small amount of potatoes in rotation with his hay.

The beans and potatoes are sold to farm stands, orchards and some retail stores around the state, but most are sold in bulk to regular customers coming to the farm. The hay is sold directly from the farm too.

Much of the fertility is based on conventional bagged fertilizers, but Tony has made an arrangement this year with a dairy farmer for manure.

Very little herbicide is used. Weed control is primarily based on the crop rotation and cultivation. Weeds are controlled in the beans with 2 cultivations with Liliston rolling cultivators.

No insecticides are used on the farm.

Tony has a rotation designed for weed control and to build soil organic matter. He raises beans for 3 years and then hay for 3 years. Rye is often planted for a fall cover crop. The year of establishing the hay (a timothy/clover mix), Tony plants oats in the spring and seeds down the hay after taking the grain off.

Bambi Jones receiving a delivery of compost made from the trash at the Common Ground Fair(see entry 37).

Park, Larry

50

Entry number

Sprague ville Rd
Presque Isle, ME 04769
Aroostook
764 0582

tillable acres	140
pasture acres	0
hay acres	0

Larry raises 60 acres of seed potatoes and about 25 acres of oats. About 50 acres are in green manure.

The potatoes are cultivated twice with discs on the cultivator.

Larry sends his cull potatoes to a local composting project.

Larry is best known for his erosion control. He has years of experience of farming on slopes by use of strip cropping potatoes, timothy, annual rye, and oats. His rotation is one year in potatoes, then one year in green manure that gets plowed back in, or a year in oats for grain. The straw gets plowed back in. He has experience growing annual rye, millet, oats, sorghum, and corn as green manures.

Pearlman, Arnold and Bonnie

51

Entry number

Box 3230
Jonesport, ME 04649
Washington
497 2641

tillable acres	12
pasture acres	0
hay acres	0

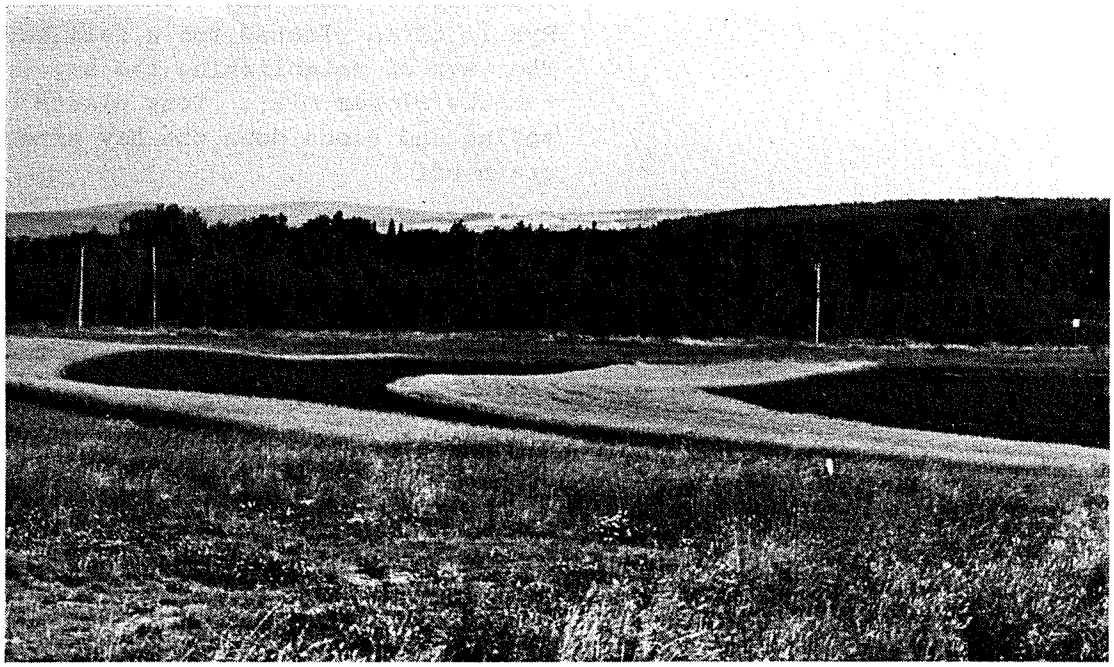
The Pearlmans grow 10 acres of certified organic mixed vegetables, including potatoes, beets, carrots, onions, squash, peas, and cabbage. They also have a quarter acre of strawberries and 3 acres of apples.

They sell most of their crop to restaurants and some mail order.

Soil fertility is maintained with compost made primarily from various kinds of fish wastes. Composting is done in pits to conserve nutrients and reduce odors. Soil nutrients are supplemented with sul-po-mag and seaweed.

Weeds are controled with heavy layers of oat straw mulch. Hand hoeing and pulling are important.

Many separated fields and crop rotation are crucial to pest control. Bt is used on Colorado potato beetles.



Larry Park does an excellent job of controlling erosion by strip cropping his potatoes, grass, and oats (see entry 50).

Perkins, Charlie

52

Entry number

RFD 1 Box 80
Exeter, ME 04435
Penobscot
379 2921

tillable acres	550
pasture acres	0
hay acres	0

Charlie raises 300 acres of potatoes and 250 acres of oats.

The Perkins market their potatoes to chip plants in the Northeast. Their oats and any other grain they sell ususally goes to a feed company here in Maine.

Herbicide use is reduced by the use of cultivation for some weed control. They use a rear mounted, 4 -row cultivator.

Potatoes are rotated with small grains. Usually oats are grown in non-potato years. The oats are undersown with mammoth red clover. Nearly all of the potato ground is covered in the fall with winter rye. Sometimes the winter rye is grown to seed and the grain harvested. In off years the rye is followed with oats. Charlie has experimented with lupins and although they grew quite well he had trouble with deer eating the crop.

Ricker, Wayne and Shirly

53

Entry number

Bx 60 Bridge St.
Lisbon, ME 04250
Androscoggin
353 4513

tillable acres	150
pasture acres	50
hay acres	50

The Rickers raise 12 to15 acres of mixed vegetables and sweet corn. They also raise hay and corn silage to feed 40 to 60 heifers.

At one time they ran a dairy, but now they raise only replacement heifers.

The vegetables are sold mostly from their own roadside stand. In addition to the produce, the Rickers sell farm-made compost, either bagged or in bulk.

Fertility is based on the compost, which is made from waste materials received from the local community. They get leaves from the town, food waste from a local college dinning hall, and they mix it with their heifer manure. The leaves are also used for animal bedding that is later put in the compost piles. Windrows are made and the compost is turned with a manure spreader. A flail mower is used to get good particle size and thorough mixing.

Weeds are controled with mechanical cultivation.

Dennis King controls weeds in his organic crops with a wide array of cultivation equipment (see entry 40).

Roberts, Tom

54
Entry number

1010 North Rd
Dixmont, ME 04932
Penobscot
257 4033

tillable acres	10
pasture acres	10
hay acres	0

Tom raises 6 acres of certified organic mixed vegetables.

The market is split between farmers markets and natural food stores.

Tom uses compost made from community leaves and mulch hay. He supplements nutrients with sul-po-mag and a commercial organic fertilizer.

They grow a wide variety of organic vegetables and hoop house tomatoes. Nancy and Richard have cut way back on their production as they get ready to retire.

Tom uses Bt for Colorado potato beetles and cabbage worms. Rotenone is used for cucumber beetles. Floating row covers are used to protect crops from cabbage root maggot flies.

The crop rotation is designed to control weeds, avoid insects, and manage nutrients. A basic plan is as follows: year 1 greens, root crops, and herbs are planted for summer harvest and rye for fall cover. Year 2 curcurbits with undersown legumes are grown. Year 3 corn, tomatoes, or cole crops are grown. In year 4 peas are grown in the spring and early summer and then hairy vetch/winter rye planted to begin the year out of cash crop production in a green manure.

Robinson, John

55
Entry number

RFD 1
Athens, ME 04912
Somerset
654 2425

tillable acres	32
pasture acres	40
hay acres	32

Jay grows an acre of certified organic vegetables, nearly an acre of potatoes, a quarter acre of sweet corn, and an acre of winter squash.

He has a variety of marketing outlets. He sells off a road side stand, to specialty stores, at the Common Ground Fair, and runs a CSA.

The basis of soil fertility is composted manure. Nutrients are supplemented with manure tea and commercial organic fertilizer.

Jay uses a variety of weed control techniques. At the heart of the program is his crop rotation. He also uses a two row spider mounted on a three point hitch for his larger crops like potatoes and beans. For the small crops he depends on wheel hoes and hand hoes with hired labor. A rotovator is used to control weeds between rows of squash before they run.

Jay's rotation includes a long lay over in a sod cover, which is the best crop rotation to build soil structure and encourage soil biological activity. His basic plan is: year 1 raise corn or squash, year 2 plant rye or oats with undersown clover, year 3 grow potatoes, years 4-9 the land is in a timothy clover hay crop, and year 10 a clover green manure is planted.

Schartner, Herbert and Phylis
Knox Ridge Rd.
Thorndike, ME 04986
Waldo
568 3668

56
Entry number

tillable acres	35
pasture acres	0
hay acres	0

The Schartners raise 20 acres of strawberries, an acre of raspberries, 10 acres of sweet corn, and about an acre of mixed vegetables. They also operate an apple orchard.

The strawberries are nearly all sold PYO. The sweet corn and vegetables are sold at farmers market.

The Schartners use liquid dairy manure from a neighbor farm as their chief source of nutrients. The manure is spread before planting corn and before planting new strawberry fields. Fish emulsion is used as a starting solution and at renovation in strawberries.

Herb uses a Badalini as his key cultivation tool. It is a multi-head rototiller that is PTO driven. It is similar to a Multivator. It can come with different head widths and the heads can be set different distances apart. It can be ordered with 2-7 heads and is very suitable to large scale strawberry production.

The corn is IPM. All insect control is based on field scouting. Most years very little insecticide is used.

The basic crop rotation is 2 years of corn and then 4 years of strawberries. Periodically a green manure is planted.

Sherman, Al

2679 East Conway Rd
Center Conway, NH 03813
Carrol
603 939 2412

57
Entry number

tillable acres	180
pasture acres	0
hay acres	90

Al and his family raise 120 acres of silage corn, 25 acres of sweet corn, 35 acres of mixed vegetables, a half an acre of strawberries, a half an acre of cut flowers, and 5 hoop houses of tomatoes, cucumbers, melons and peppers.

In addition to the crops the Sherman family operates a dairy milking 90 cows.

All the crops are sold out of an on-farm store.

The fertility is met with a combination of manure and conventional fertilizer.

Herbicide use in vegetables and corn is greatly reduced by employing cultivation equipment. An I & J tine cultivator with crop guards is used in most crops. A Lilliston cultivator is used for corn.

Al is in the corn IPM program and works very closely with the Extension faculty at UNH.

Al Sherman handles much of his weed problem with a "S" tine cultivator (see entry 57).

Shur, Arthur

58

Entry number

P.O. Box 490
Island Falls, ME 04747
Aroostook
463 2365

tillable acres	400
pasture acres	0
hay acres	0

Arthur raises about 200 acres of potatoes each year. Cooperating with a dairy farmer an additional 200 acres are used for barley each year. The dairy farmer plants and harvests the barley and leaves the straw, which is plowed back into the soil along with the undersown clover.

Cooperating with a dairy farmer allows Arthur to get additional benefit from the year out of potatoes. Arthur grows one year of potatoes then a year of barley undersown with red clover.

Green manures in the crop rotation also serve as late season livestock feed on Eric Sideman's farm (see entry 59).

Sideman, Eric and Barbara Eldridge

59

Entry number

RFD 1 Box 1455
Greene, ME 04236
Androscoggin
946 7317

tillable acres	3
pasture acres	4
hay acres	0

Eric and Barbara raise about a half acre of strawberries, a quarter acre of new potatoes and peas, a few early vegetables, and cut flowers. They also produce early tomatoes in a hoophouse. All crops are certified organic.

Eric and Barbara keep a small number of sheep, pigs, broilers, and layers.

The strawberries are sold PYO. The other vegetables and flowers are raised to be ready for sale at the farm only during the strawberry season.

The basis of soil fertility is legume green manures and composted animal bedding and manure. Supplemental crop nutrition is attained with sul-po-mag, rock phosphate, wood ash, fish hydrolysate, and compost tea.

Competitive green manures in crop rotations are the basis of weed control. Cultivation with a wheel hoe and hand hoes.

Crop rotation is the key to managing insect pests of strawberries. Strawberry fields are plowed under immediately after harvest the second year, burying the strawberry clipper. The new fields are distant enough to hamper migration of pests. Bt is used for Colorado potato beetle control. Eric will use botanical insecticides as a last resort. Row covers are used to exclude the cabbage maggot fly from early broccoli.

Strawberries are in a field for three years. Immediately after harvest the second year the strawberries are plowed and a hairy vetch/winter rye mix is planted in mid August. The mix is grown until early June the following year when it is plowed under and crimson clover is planted. In the late summer oats are planted as a winter cover and the land goes back to strawberries the following spring. The vegetable land is taken out of production periodically to grow green manures.

Smith, Hershel and Greg

60

Entry number

P.O. Box 189
Blaine, ME 04734
Aroostook
425 3421

tillable acres	3,000
pasture acres	0
hay acres	0

Greg and Hershel raise about 1,500 acres of potatoes, and about 1,500 acres of broccoli.

The crops are sold to chain stores and other wholesale market.

Most of the fertility is based on conventional sources, but Hershel and Greg have been working with compost as a soil conditioner and supplemental nutrient source for quite a few years now. The compost is made from waste potatoes, sawdust, and fly ash. They say it does a good job of conditioning the soil and adding organic matter.

Herbicide use is reduced by use of cultivation for weed control.

Like many farmers the Smiths are still working out their rotation. Since adding brocolli to their crops they have been working on a grain-potato-brocolli-grain sequence. But, they found that they were not getting enough organic matter out of that and now they have added a season of annual rye replacing one of the years of potatoes or brocolli. On early brocolli fields oats are planted after harvest and often reach 2 feet before winter.

Snell, Ramona and John

61

Entry number

P.O. Box 326
Buxton, ME 04004-0326
York
929 5318

tillable acres	10
pasture acres	0
hay acres	0

Ramona and John raise 9 acres of mixed vegetables and herbs, plus an acre of potatoes and greenhouse bedding plants, perennials, and seedlings.

The two major outlets of crops are a road side stand at the farm and at farmers markets.

Composted horse manure and legume green manures are the basis of their fertility program. Nutrients are supplemented with banded blood meal, sul-po-mag, and fish hydrolysate.

Mechanical cultivation with sweeps belly mounted on a high clearance tractor is key to weed control. The Snell's also grow living mulches. For example, sweet clover is grown between rows of tomatoes. The tomatoes are planted through black plastic. The following year the tomatoes are grown in the rows where the sweet clover was.

The Snell's are experienced with botanicals and Bt. They also release beneficial predatory and parasatoid insects in the greenhouses.

The Snells use sweet clover as a living mulch between rows of tomatoes(see entry 61).

Spiller, Bill and Anna

62
Entry number

RR 2 Box 1230
Wells, ME 1230
York
985 2575

tillable acres	25
pasture acres	0
hay acres	60

Bill and Anna raise 14 acres of sweet corn, 5 acres of mixed vegetables, 5 acres of strawberries, and operate a 7 acre apple orchard. They also raise tomatoes in a home made hoop house.

Most of the produce is sold at their own farm store.

Bill and Anna use mechanical cultivation, crop rotation with green manures, and hand hoeing to minimize herbicide use. Many crops are raised with no herbicide. The cultivating equipment is home made and mounted on a high clearance Kubota tractor.

Bill has a gift for designing and using a welder to build all sorts of equipment, such as a plastic layer, strawberry planter, cultivator, etc.

They are in the IPM program for pest control.

Bill says he has no planned rotation because there are too many factors that seem to foil plans two years out of three. But, they do rotate crops well without a long range plan and make good use of cover crops and green manures. Land is covered with oats or winter rye in the fall. They frequently use buckwheat and oats as summer cover crops.

Stevenson, Ford

63
Entry number

RR 1 Box 2811
Wayne, ME 04284
Kennebec
685 3532

tillable acres	25
pasture acres	0
hay acres	0

Ford raises 15 acres of strawberries and 10 acres of sweet corn.

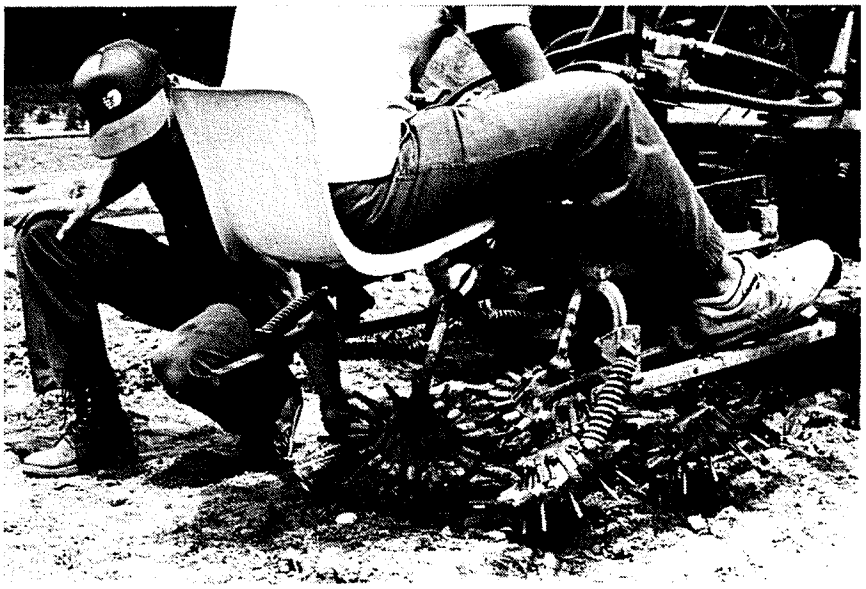
The strawberries are sold PYO and the corn and some of the strawberries are sold directly from the farm.

Herbicide use is greatly reduced by extensive cultivation. Ford uses a rear mounted finger weeder that can be steered accurately over the row by a second driver. He also has adapted much of his equipment for strawberry production. He cultivates with a Lilliston in the corn.

Carefully timed crop rotation helps Ford minimize his pesticide use on strawberries. He uses IPM in the sweet corn.

The basic crop rotation Ford uses is strawberries and sweet corn, because they do not share pests and weed control is very effective during the corn years. He also grows some peas and makes use of green manures and fall cover crops.

Ford Stevenson's rear mounted finger weeder is steered over the row independently by a second driver using hydraulics(see entry 63).



Stutzman, Sid

64

Entry number

RR 1 Box 1002
Dover-Foxcroft, ME 04426
Penobscot
564 8596

tillable acres	40
pasture acres	0
hay acres	0

Sid raises 20 acres of potatoes, 2 acres of strawberries, 5 acres of peas, 8 acres of sweet corn and 4 acres of vine crops.

He sells the produce to farm stands and grocery stores.

Sid has designed and built his own cultivator. He wanted something that would be quick to get on and off. He built one that fits a three point hitch and uses "S" tines. The "S" tines can be rearranged easily to fit row spacing.

He rotates vegetables around with potatoes. All the vegetable land is cover cropped with rye after harvest. Land with early crops builds up quite a lot of organic matter during the late summer and fall. Sid feels this has helped a lot with water holding and has benefited the potatoes.

Tangerini, Laura and Charles

65

Entry number

RR 1 Box 180
North Berwick, ME 03906
York
676 4049

tillable acres	55
pasture acres	0
hay acres	50

Laura and Charles raise 45 acres of sweet corn, 2 to 4 acres of green beans, 4 acres of peas, a half acre of tomatoes, and about a half acre of strawberries. They also have a hoophouse for early tomatoes.

The produce is sold from their roadside stands and at farmers markets.

The major sources of fertility are chicken and horse manure. They supplement nutrients nutrients with some commercial fertilizer and wood ash.

The Tangerinis use very little herbicide. They depend on mechanical cultivation with belly mounted sweeps, tillers, hand weeding, and black plastic.

IPM is used to manage pests in the sweet corn.

All the vegetable land is covered in the fall with rye. Laura uses millet and oats for green manures in the summer. The millet and oat flower heads are used for dry flower arangments.

The Thayer's manure storage facility protects the environment from runoff of nitrates and conserves nutrients on the farm(see entry 66).

Thayer, William and Cynthia

66
Entry number

Box 570
Gouldsboro, ME 04607
Hancock
963 7771

tillable acres	10
pasture acres	15
hay acres	15

The Thayers raise two and a half acres of certified organic mixed vegetables and potatoes.

They raise 6 beef cows, lambs from 12 ewes, a dairy cow, 25 layers, and varying numbers of turkeys and pigs. The wool from the sheep is special quality for hand spinners.

The farm products are sold directly from the farm.

Fertility comes from compost and manure with some supplemental liquid seaweed.

Insect control is by crop rotation. Bt is used for Colorado potato beetle and cabbage worms.

They raise the crops on five separate major gardens and a few smaller ones. The vegetable crops are rotated from garden to garden trying to follow a plan based on avoiding pests and diseases and managing nutrients. Many crops are undersown with clovers, which then serve as a winter cover crop.

Thurston, Lynn

67
Entry number

14 Glenwood
Gorham, ME 04038
Cumberland
839 3803

tillable acres	17
pasture acres	0
hay acres	0

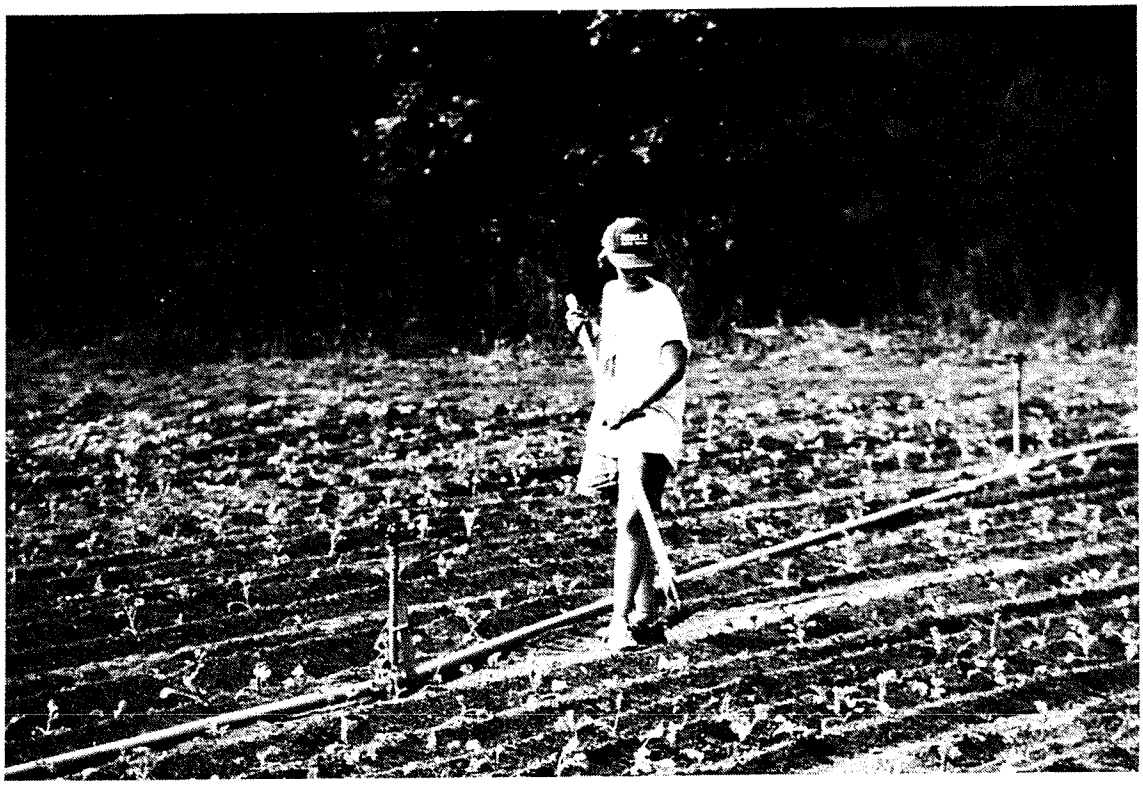
Lynn raises particular vegetables that she can sell through her own special marketing channels. This year she had 4 acres of flowering kale, 1 acre of napa cabbage, 9 acres of winter squash, and 3 acres of pumpkins.

Wholesale marketing is Lynn's forte. She used to work in the Boston Produce Market and now works in the winter for a specialty herb and greens company in California.

Dairy manure is the basis of fertility. Lynn uses a commercial liquid starting solution at transplanting.

Weed control is by mechanical cultivation with belly mounted knives and sweeps. Hand hoeing is used extensively.

On the Thurston farm hand hoeing polishes up weed control after mechanical cultivation(see entry 67).



Valcourt, Michael

68

Entry number

P.O. Box 333
Alfred, ME 04002
York
499 2278

tillable acres	6
pasture acres	0
hay acres	0

Michael raises 2 acres of strawberries, 2 acres of sweet corn, 2 acres of pumpkins, and about an acre of mixed vegetables. He also produces and breeds fall mums.

Michael sells his produce directly from the farm.

He uses some horse manure, greensand and some conventional fertilizer.

The use of herbicides is reduced by using mechanical cultivation. He uses a multivator in his corn.

Michael has developed an interesting rotation, allowing a natural sod to develop for a few years in rotation with his crops. For example, after strawberries he plants winter rye after the last harvest, and allows it to reseed itself the second year and allows a natural sod to develop with it. In corn he sows winter rye in mid August. He mows the stalks after harvest and allows the rye to reseed itself the following season and allows a natural sod to develop. Vegetable land is pulled out of production every few years and seeded to rye. Michael leaves the sod for two to three years before going back to a cash crop.

Volckhausen, Paul

69

Entry number

RR 2 Box 3760
East Holden, ME 04429
Hancock
667 9212

tillable acres	9
pasture acres	7
hay acres	1.5

Paul raises 5 acres of mixed vegetables, 2 acres of barley, and 2 acres of oats. All of the crops are certified organic.

Lambs from 20 ewes and varying numbers of broilers, turkeys and pigs are produced each year.

Paul sells most of his produce at farmers markets and sells some wholesale.

Legume green manures and composted animal manures are the heart of soil fertility management on Paul's farm. Nutrients are supplemented with rock phosphate, sul-po-mag, and wood ash.

Weeds are managed by tractor mounted and hand cultivation equipment. Paul has an Allis Chalmers C with vegetable cultivators on it and Besserides spiders that he uses in the larger crops like corn, beans, and potatoes. He also uses the spiders to hill the potatoes. In the small crops that are planted in rows too close together for that equipment, he uses a wheel hoe with knives. Paul also can take the tines off his Troy Built rototiller and mount a "V" sweep.

Floating row covers protect crops from difficult to control pests such as cucumber beetles or cabbage root maggots. Bt controls Colorado potato beetle and cabbage worms. Crop rotation plays a major role in managing insect pests and diseases.

Paul rotates his vegetable land with alfalfa and small grains.

Wilcox, Benjamin

Box 1010 North Rd
Dixmont, ME 04932
Penobscot, ME 04932
234 2795

70
Entry number

tillable acres	7
pasture acres	0
hay acres	0

Ben raises four and a half acres of certified organic mixed vegetables and an acre of certified organic potatoes.

Ben concentrates on selling his produce at farmers markets and natural food stores.

Fertility is based on green manures and local sources of manures when available. Nutrient needs are supplement with sul-po-mag, borax, and a comercial fertilizer made from composted poultry manure and feather meal.

Ben's crop rotation with green manures is his first line of weed control. Once every four years or so each field is taken out of cash crop production and put through a series of short duration green manures over the growing season. For example, Ben will grow oats in the spring, plow them under in the late spring, then plant sorghum/sudan grass, plow that under in the late summer and then sow a fall cover. The competitive green manures and the periodic tillage between them offer very good weed control. He also grows legume green manures in rotation to bring nitrogen into his system.
Mechanical cultivation is the second control of weeds. Ben has a Super A with cultivators and hilling discs. For his crops planted in rows too close together for this he uses a wheel hoe.

Ben has extensive experience with organic methods of insect control. He uses Bt to control cabbage worms and Colorado potato beetles. Rotenone is used when necessary for tough insects such the cucumber beetle. Maggots such the cabbage root maggot are excluded with using floating row covers.

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	Borkowski	York	9
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	Gill	Sagadahoc	29
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Fertilzer

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Goranson	Lincoln	30
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Agnew	Androscoggin	1
Basile	Franklin	2
Batchelder	Rockingham, NH	3
Beaudoin	Kennebec	4
Beckwith	Cumberland	5
Bellmore	Knox	6
Birdsall	Hancock	7
Borkowski	York	9
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Elvin	Kennebec	20
Ernst	Hancock	21
Fogler	Penobscot	24
Friedman	Sagadahoc	25
Galland	Waldo	27
Gerritsen	Aroostook	28
Gill	Sagadahoc	29
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Beckwith	Cumberland	5
Birdsall	Hancock	7
Colson	Androscoggin	13
Douglass	Kennebec	18
Gross	Androscoggin	33
Hayes	York	35
King	Hancock	40
Moore, G.	Knox	48
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Basile	Franklin	2
Batchelder	Rockingham, NH	3
Birdsall	Hancock	7
Douglass	Kennebec	18
Galland	Waldo	27
Gill	Sagadahoc	29
Kafka	Piscataquis	39
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Wilcox	Penobscot	70

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Birdsall	Hancock	7
Bowden	Waldo	10
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	Birdsall	Hancock	7
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	Gill	Sagadahoc	29
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	Fitzpatric	Aroostook	23
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Birdsall	Hancock	7

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Basil	Franklin	2
Batchelder	Rockingham, NH	3
Beckwith	Cumberland	5
Birdsall	Hancock	7
Bok	Knox	8
Casper	Franklin	12
Colson	Androscoggin	13
Douglass	Kenebec	18
Eggert	Hancock	19
Ernst	Hancock	21
Friedman	Sagadahoc	25
Galland	Waldo	27
Gerritsen	Aroostook	28
Greager	Waldo	32
Gross	Androscoggin	33
Hayes	York	35
Jones, B	Lincoln	37
Jones, P	Penobscot	38
Kafka	Piscataquis	39
King	Hancock	40
McLeod	Cumberland	41
Miller, B&M	Lincoln	44
Miller, S	Aroostook	45
Moore, G.	Knox	48
Pearlman	Washington	51
Roberts	Penobscot	54
Robinson	Somerset	55
Sideman	Androscoggin	59
Volckhausen	Hancock	69
Wilcox	Penobscot	70

Pest control

Bt

Agnew	Androscoggin	1
Basile	Franklin	2
Beckwith	Cumberland	5
Birdsall	Hancock	7
Bowden	Waldo	10
Devoe	Aroostook	16
Douglass	Kennebec	18
Ernst	Hancock	21
Gerritsen	Aroostook	28
Goranson	Lincoln	30
Johnston	Kennebec	36
Jones	Lincoln	37
Kafka	Piscataquis	39
King	Hancock	40
Mcleod	Cumberland	41
Mireault	Androscoggin	46
Pearlaman	Washington	51
Roberts	Penobscot	54
Sideman	Androscoggin	59
Snell	York	61
Thayer	Hancock	66
Volckhausen	Hancock	69
Wilcox	Penobscot	70

Botanical pesticides

Basile	Franklin	2
Bowden	Waldo	10
Douglass	Kennebec	18
Ernst	Hancock	21
Gill	Sagadahoc	29
Johnston	Kennebec	36
Jones	Lincoln	37
Kafka	Piscataquis	39
King	Hancock	40
Mcleod	Cumberland	41
Mireault	Androscoggin	46
Roberts	Penobscot	54
Sideman	Androscoggin	59
Snell	York	61
Wilcox	Penobscott	70

IPM

Bellmore	Knox	6
Cross	Waldo	14
Elvin	Kennebec	20
Goranson	Lincoln	30
Maxwell	Cumberland	42
Merrill	Cumberland	43
Schartner	Waldo	56

IPM (cont.)

Sherman	Carrol(NH)	57
Spiller	York	62
Stevenson	Kennebec	63
Tangerini	York	65

Crop rotation

Basile	Franklin	2
Batchelder	Rockingham (NH)	3
Beckwith	Cumberland	5
Bellmore	Knox	6
Borkowski	York	9
Colson	Androscoggin	13
Dorman	Penobscot	17
Ernst	Hancock	21
Johnston	Kennebec	36
Jones, P.	Penobscot	38
Miller	Lincoln	44
Pearlman	Washington	51
Roberts	Penobscot	54
Sideman	Androscoggin	59
Stevenson	Kennebec	63
Thayer	Hancock	66
Volckhausen	Hancock	69

Row cover

Birdsall	Hancock	7
Carter	Oxford	11
Colson	Androscoggin	13
Douglass	Kennebec	18
Johnston	Kennebec	36
Jones, B.	Lincoln	37
Mireault	Androscoggin	46
Roberts	Penobscot	54
Sideman	Androscoggin	59
Volckhausen	Hancock	69
Wilcox	Penobscot	70

Weeds, Mechanical Control

Basket weeder (Buddingh)

Batchelder	Rockingham, NH	3
Colson	Androscoggin	13
Dennison	Sagadahoc	15
Ernst	Hancock	21
King	Hancock	40
Maxwell	Cumberland	42

Finger weeder (Buddingh)

Batchelder	Rockingham, NH	3
Maxwell	Cumberland	42
Stevenson	Kenebec	63

Springtine (Lely)

Miller, B&M	Lincoln	44

Wheel hoe

Bowden	Waldo	10
Elvin	Kennebec	20
Johnston	Kennebec	36
Jones	Lincoln	37
Robinson	Somerset	55
Sideman	Androscoggin	59
Volckhausen	Hancock	69
Wilcox	Penobscot	70

Other mechanical cultivator

Beaudoin	Kennebec	4
Bellmore	Knox	6
Carter	Oxford	11
Colson	Androscoggin	13
Cross	Waldo	14
Dennison	Sagadahoc	15
Elvin	Kennebec	20
Frost	Penobscot	26
Gerritsen	Aroostook	28
Goransen	Lincoln	30
Goughan	Aroostook	31
Johnston	Kennebec	36
Ricker	Androscoggin	53
Roberts	Penobscot	54
Robinson	Somerset	55
Schartner	Waldo	56
Snell	York	62
Spiller	York	62
Tangerini	York	65
Thurston	Cumberland	67
Valcourt	Cumberland	68
Volckhausen	Hancock	69
Wilcox	Penobscot	70

Weed control

Crop rotation

Agnew	Androscoggin	1
Bellmore	Knox	6
Birdsall	Hancock	7
Bowden	Waldo	10
Colson	Androscoggin	13
Dennison	Sagadahoc	15
Ernst	Hancock	21
Estes	Cumberland	22
Friedman	Sagadahoc	25
Frost	Penobscot	26
Gerritsen	Aroostook	28

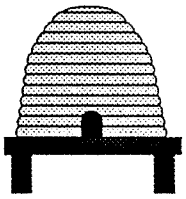
Weed control (Crop rotation cont.)

Gill	Sagadahoc	29
Goranson	Lincoln	30
Johnston	Kennebec	36
King	Hancock	40
Maxwell	Cumberland	42
Neves	Waldo	49
Roberts	Penobscot	54
Sideman	Androscoggin	59
Spiller	York	62
Stevenson	Kennebec	63
Wilcox	Penobscot	70

December 1995 E.B. 95-24

BEE ECONOMICS

A Computer Model for Economic Analysis of Beekeeping Operations



Developed by:
Lois Schertz Willett
Cornell University

Nicholas W. Calderone
U.S. Department of Agriculture, Agricultural Research Service

Malcolm T. Sanford
University of Florida

Department of Agricultural, Resource, and Managerial Economics
College of Agriculture and Life Sciences
Cornell University
Ithaca, New York 14853-7801

INSTALLATION INSTRUCTIONS

BEE ECONOMICS

Developed by:
Lois Schertz Willett, Dept. of Agricultural, Resource, and Managerial Economics
Cornell University, Ithaca, NY 14853 607-255-4489,

Nicholas W. Calderone, USDA/ARS, Bee Research Laboratory, Beltsville, MD 20705

Malcolm T. Sanford, Entomology and Nematology Department,
University of Florida, Gainesville, FL 32601

Assistance received from S. B. Willett, J. C. Bernard, and S. C. Czado

This project was funded, in part, by grant #LNE91-27 from the U.S. Department of Agriculture, Sustainable Agriculture, Research and Education Program (formerly LISA) to N. W. Calderone and L. S. Willett.

NOTE: This computer model assumes familiarity with computers and Microsoft® Excel.

To install Bee Economics onto your hard disk:

If you have an IBM Compatible Computer:

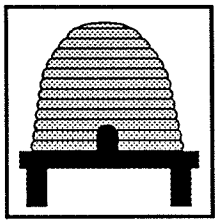
1. Insert the Bee Economics disk in Drive A (or Drive B).
2. At the DOS prompt, type
   MD C:\BEECON
3. At the next prompt, type
   COPY A:\BEECON*.* C:\BEECON
   or COPY B:\BEECON*.* C:\BEECON
4. Open Microsoft® Excel.
5. Choose Open from the File menu.
6. At the dialog box, type
   C:\BEECON\BEE_ECON.XLM
7. Select the modules you wish to use and follow the directions to open.

If you have a Macintosh Computer:

1. Insert the Bee Economics disk in the floppy disk drive.
2. Copy the BEECON folder to your hard disk.
3. Open Microsoft® Excel.
4. Choose Open from the File menu.
5. At the dialog box, double click on BEE_ECON.XLM in the BEECON folder on your hard disk.
6. Select the modules you wish to use and follow the directions to open.

You are now ready to begin working with Bee Economics. We hope you will find this economic package helpful in the analysis of your beekeeping operation.

BEE ECONOMICS



A Computer Model for Economic Analysis of Beekeeping Operations

Developed by:
Lois Schertz Willett, Department of Agricultural, Resource and Managerial Economics, Cornell University, Ithaca, NY 14853-7801, 607-255-4489

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WELCOME TO BEE ECONOMICS

INTRODUCTION

Welcome to Bee Economics. We hope you find this economic package helpful in the analysis of your beekeeping operation.

All the instructions necessary to use Bee Economics are included in this document. It is important to have a basic understanding of Microsoft® Excel before using Bee Economics.

Bee Economics consists of several modules that are linked together so that information entered in one module flows to appropriate sections of other modules. The modules are identified in the section called Description of Modules. Information about entering data and using Bee Economics is included in Getting Started. Helpful hints for the Bee Planner Module, an effective forecasting tool, are included in the section called Hints for the Bee Planner Module. Finally, the records and economic analysis of a sample beekeeping operation are included in the section, Sample Model Output.

The minimum requirements to use Bee Economics on an IBM compatible machine are a 386 machine, 4 megs of RAM, Windows 3.1, and Microsoft® Excel 4.0. The minimum requirements to use Bee Economics on a Macintosh machine are 4 megs of RAM and Microsoft® Excel 4.0.

If you have any recommendations for improvements to, or questions about Bee Economics, please write or call Dr. Lois Schertz Willett at Department of Agricultural, Resource, and Managerial Economics, Cornell University, Ithaca, NY 14853-7801, 607-255-4489. She may also be contacted via Email at lsw2@cornell.edu.

DESCRIPTION OF MODULES

BEE PLANNER

Bee Planner allows you to forecast your beekeeping operation four years in the future or under four different scenarios. The first year (or scenario) is derived from information available in the Record Keeping module. Other scenarios are based on inflation rates and adjustment factors for product production, prices, and expenses. Current product adjustment factors are derived from economic analysis of nearly 50 beekeeping operations in the Northeast region. This economic analysis incorporates joint product production and externalities in the beekeeping industry.

The Bee Planner module consists of a single file BEEPLAN.XLS. Information for the Bee Planner module is derived from the Record Keeping module.

RECORD KEEPING

Record Keeping allows you to identify all revenue and expenses in your complete beekeeping operation. This module will generate financial statements, operating statements and assist you in determining your cash flow and net worth. This module was based on the work by Dr. M. T. Sanford, "A Study in Profitability for a Mid-Sized Beekeeping Operation" Circular 722, Institute of Food and Agricultural Sciences, University of Florida, August 1986.

The Record Keeping module consists of four (4) files: INVESTMT.XLS, EXPENSE.XLS, REVENUE.XLS, and CASHFLOW.XLS. Each file is linked to other files so that information can be updated quickly and efficiently.

The INVESTMT.XLS file contains information on investment in bees, buildings, land, fences, hives, machinery and equipment. Summary tables for depreciation, interest, and principal and interest payments are also included. In addition, the allocation of colonies between the enterprises is done in this file.

The EXPENSE.XLS file contains information on monthly and annual expenses incurred by each enterprise in the operation and the total operation. A summary of the allocation of the expenses is included in this file.

The REVENUE.XLS file includes revenues from product sales of the operation.

The CASHFLOW.XLS file presents the cash flow analysis and summary statistics for the entire beekeeping operation. Gross returns, operating profit, net profit and economic profit are calculated.

ENTERPRISE ANALYSIS

Enterprise Analysis allows you to analyze each enterprise in your beekeeping operation. Information for the enterprise analysis is derived from the Record Keeping module. Information on revenue, expenses, cash flow, gross returns, operating profit, net profit, and economic profit are presented for each enterprise and per hive and per pound of honey produced.

The Enterprise Analysis consists of a single file, ENTERPR.XLS. Information for the Enterprise Analysis is derived from the Record Keeping module.

GETTING STARTED

BACKING UP

Before using the program, please make a backup of Bee Economics or copy it to your hard disk. If you are not familiar with how to make a backup, refer to your computer's User Manual. Always use the backup copy or the copy on your hard disk when you are ready to work. Do not use the original computer disk.

INSTALLATION

Installation of Bee Economics can be done in a few easy steps. The steps are identified on the Installation Instructions that came with your Bee Economics disk.

ASSUMED KNOWLEDGE

Since Bee Economics is a program that requires Microsoft® Excel to operate, it is very important to have a basic understanding of Microsoft® Excel. Your knowledge of this spreadsheet will allow you to gain full use of the Bee Economics program to analyze your beekeeping operation.

PROTECTION

Each file has been protected (without a password). To change a file or adjust a formula, select Options, Unprotect Document. Click OK. Remember to Protect the document when you are done making changes.

ENTERING INFORMATION

To enter information into any of the files, use the enter key or tab key. These keys will take you from one unlocked cell to the next for easy data entry. Each unlocked cell can be identified by the line underneath it.

LINKING OF EACH MODULE

All of the modules are linked to each other. The information you enter in the Record Keeping module will flow to the Enterprise Analysis Module and the Bee Planner module. This linking provides you with information that can be viewed in a variety of ways. For example, you may wish to analyze your cash flow for the entire operation by looking at CASHFLOW.XLS. On the other hand, you may want to view the profitability of each enterprise in your operation by looking at ENTERPR.XLS.

CALCULATION

Due to the file sizes in Bee Economics, calculation has been turned off. To update calculation after data entry, press control =. For immediate update of information between files and modules as you enter data, remember to turn calculation on under the Options menu. If you turn calculation on, this will seriously impact the speed of data entry.

GETTING STARTED (continued)

UPDATING REFERENCES

If you get a message "Update references to unopened documents?", you should respond NO.

HINTS FOR THE BEE PLANNER MODULE

DIRECT COMPARISONS

The Bee Planner module has been designed to provide separate and distinct columns side by side for direct comparison of the alternatives that you establish. For example, different colony levels may be established for each column or the same colony level may be used for each year.

INFLATION FACTOR

There is an inflation factor for the second year through the fourth year. A factor other than 0.0% affects each monetary value in the planner. The inflation factor will not affect the level of colonies or products. Make sure you type a decimal point (period, before entering the Inflation Factor (i.e., 10 % should be entered as .1).

ADJUSTMENT FACTOR

The Adjustment Factor (Adj Factor column) can be different for each item. The factor affects the second year through the fourth year of each item. A factor other than 0.0% affects each year by the percentage amount. For example: If you expect your sugar expenses to increase 10% each year, type .1 for 10% on the sugar line's Adj Factor column. The following year's sugar expense will be automatically adjusted by 10%.

UNIQUE PRODUCT ADJUSTMENT FACTORS

Some of the products have separate adjustment factors for each year in the planner. These adjustment factors have been determined based on the responsiveness of beekeepers to product price changes. The factors were estimated from a national survey of beekeepers by Cornell University.

NO ADJUSTMENTS

If there is one year you don't want to increase by the Adj Factor, go to that year's column and type in the amount you want (doing this will erase the equation for the Adj Factor increase for that year).

CUMULATIVE IMPACT OF INFLATION AND ADJUSTMENT FACTORS

Using the Inflation Factor and the Adjustment Factor together has a cumulative effect. For example: 10% in Inflation Factor and 5% in Adjustment Factor results in an increase of 15%.

DEPRECIATION AND INTEREST

The Depreciation and Interest for the second, third and fourth year are derived from the investment worksheet, INVESTMT.XLS. Hence, these values will not be altered by the adjustment and the inflation factors in the Bee Planner module. If you are analyzing different scenarios, rather than different years, and you don't want the depreciation and interest to reflect the information in the INVESTMT.XLS worksheet, you should unprotect the Bee Planner and manually insert the depreciation and interest for each scenario.

SAMPLE MODEL OUTPUT

SAMPLE OPERATION

When Bee Economics is shipped, information for a sample operation is included. The following pages are the complete model output for this sample operation. You may find it useful to skim the model output prior to entering your information. Keep in mind that the majority of the information in the output is determined by Bee Economics. You do not have to enter all of this information for your operation. Each cell that requires information from you is underlined when you install and properly open the files in Bee Economics.

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Instructions

BEE ECONOMICS INSTRUCTIONS

Developed by
Lois Schertz Willett, Dept. of Agricultural, Resource, and Managerial Economics
Cornell University, Ithaca, NY 14853 607-255-4489,
Nicholas W. Calderone, USDA/ARS, Bee Research Laboratory, Beltsville, MD 20705
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Bee Planner Module

BEE PLANNER

				1995	1996	1997	1998	Total
Inflation Factor	(none for first year):				0.02	0.02	0.02	
Colonies			Adj Factor					
Total Number of Colonies			0.0%	510	510	510	510	
Prices			Adj Factor					
Honey Price ($/pound)			1.0%	0.75	0.77	0.79	0.82	
Pollination Price ($/service)			0.5%	21.27	21.80	22.34	22.90	
Pollen Price ($/pound)			0.0%	0.00	0.00	0.00	0.00	
Queen Price ($/queen)			0.0%	0.00	0.00	0.00	0.00	
Other 1 Price ($/unit)			0.0%	0.00	0.00	0.00	0.00	
Other 2 Price ($/unit)			0.0%	0.00	0.00	0.00	0.00	
Products	95 Adjust	96 Adjust	97 Adjust					
Honey (pounds)	1.3%	1.3%	1.3%	56350.0	57064.2	57787.5	58519.9	
Pollination (services)	5.0%	5.0%	5.0%	395.0	414.6	435.3	456.9	
Pollen (pounds)	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
Queens (# of queen)	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
Other 1 (unit)	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
Other 2 (unit)	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
Revenue								
Honey				42,062.50	43,873.49	45,762.45	47,732.74	179,431.18
Pollination				8,400.00	9,038.20	9,724.89	10,463.75	37,626.84
Pollen				0.00	0.00	0.00	0.00	0.00
Queen				0.00	0.00	0.00	0.00	0.00
Other 1				0.00	0.00	0.00	0.00	0.00
Other 2				0.00	0.00	0.00	0.00	0.00
Total Revenue				50,462.50	52,911.69	55,487.34	58,196.49	217,058.03
Variable Expenses			Adj Factor					
Sugar			.0.0%	3,072.50	3,133.95	3,196.63	3,260.56	12,663.64
Medicine			0.0%	915.00	933.30	951.97	971.01	3,771.27
Hired labor (production)			.0.0%	2,797.75	2,853.71	2,910.78	2,968.99	11,531.23
Truck costs (production)			0.0%	3,546.00	3,616.92	3,689.26	3,763.04	14,615.22
Containers/labels			0.0%	8,794.00	8,969.88	9,149.28	9,332.26	36,245.42
Queens			0.0%	1,880.00	1,917.60	1,955.95	1,995.07	7,748.62
Repairs			0.0%	13.47	13.74	14.02	14.30	55.53
Hired labor (packing)			.0.0%	11.00	11.22	11.44	11.67	45.34
Truck costs (packing)			.0.0%	736.00	750.72	765.73	781.05	3,033.50
Rent			0.0%	516.00	526.32	536.85	547.58	2,126.75
Office Supplies			0.0%	276.00	281.52	287.15	292.89	1,137.56
Tools			.0.0%	300.00	306.00	312.12	318.36	1,236.48
Accounting Service			0.0%	216.00	220.32	224.73	229.22	890.27
Insurance			0.0%	1,500.00	1,530.00	1,560.60	1,591.81	6,182.41
Real estate taxes			0.0%	900.00	918.00	936.36	955.09	3,709.45
Advertising			.0.0%	1,570.00	1,601.40	1,633.43	1,666.10	6,470.92
Associatian and conventions			.0.0%	480.00	489.60	499.39	509.38	1,978.37
Lodging (production)			0.0%	1,590.00	1,621.80	1,654.24	1,687.32	6,553.36
Heating, fuel			0.0%	516.00	526.32	536.85	547.58	2,126.75
Other Expense			0.0%	0.00	0.00	0.00	0.00	0.00
Other Expense			0.0%	0.00	0.00	0.00	0.00	0.00
Other Expense			0.0%	0.00	0.00	0.00	0.00	0.00
Other Expense			0.0%	0.00	0.00	0.00	0.00	0.00
Total Variable Expenses				29,629.72	30,222.32	30,826.76	31,443.30	122,122.10
Fixed Expenses			Adj Factor					
Depreciation				12,173.91	12,173.91	12,173.91	12,173.91	48,695.65
Interest on Investment				7,466.87	7,466.87	7,466.87	7,466.87	29,867.49
Total Fixed Expenses				19,640.79	19,640.79	19,640.79	19,640.79	78,563.14
Operator Expenses			Adj Factor					
Operator Labor - Production			.0.0%	7,872.26	8,029.71	8,190.30	8,354.11	32,446.37
Operator Labor- Packing			0.0%	716.00	730.32	744.93	759.82	2,951.07
Total Operator Expenses				8,588.26	8,760.03	8,935.23	9,113.93	35,397.44
Total Expenses				57,858.77	58,623.13	59,402.77	60,198.01	236,082.68
Total Operating Profit=Revenue-Variable Exp				20,832.78	22,689.37	24,660.58	26,753.20	94,935.93
Operating Profit/Colony				40.85	44.49	48.35	52.46	186.15
Operating Profit/Pound of Honey				0.37	0.40	0.43	0.46	1.65
Net Profit = Revenue-Variable Exp-Fixed Exp				1,191.99	3,048.59	5,019.79	7,112.41	16,372.78
Net Profit/Colony				2.34	5.98	9.84	13.95	32.10
Net Profit/Pound of Honey				0.02	0.05	0.09	0.12	0.28
Economic Profit = Revenue-Operator Exp				(7,396.27)	(5,711.44)	(3,915.43)	(2,001.52)	(19,024.66)
Economic Profit/Colony				(14.50)	(11.20)	(7.68)	(3.92)	(37.30)
Economic Profit/Pound of Honey				(0.13)	(0.10)	(0.07)	(0.03)	(0.33)

Calculation of Product Adjustment Factors
Based on Elasticities and Product Price Changes

Elasticities

	Prices (across) Honey	Pollination	Wax
Honey	0.12	0.36	(0.05)
Pollination	0.12	1.84	(0.49)
Wax	0.00	0.00	0.00

Price Changes

	1994-95	1995-96	1996-97
Honey	3.0%	3.0%	3.0%
Pollination	2.5%	2.5%	2.5%
Wax			

Adjustment Factor

	1994-95	1995-96	1996-97
Honey	1.3%	1.3%	1.3%
Pollination	5.0%	5.0%	5.0%
Wax			

Record Keeping Module

Investment

This INVESTMT.XLS file contains information on investment in bees, buildings, land, fence, hives, machinery and equipment. Summary tables for depreciation, interest and cash flow analysis are also included.

ANNUAL SUMMARY OF DEPRECIATION AND INTEREST

	Replacement Value	Inv. Cost per Hive	Percent of Investment	Trade in Value	Years	Annual Depreciation	Annual Interest
Building	43,350	85.00	30%	0	18	2,408	2,168
Hives	67,900	133.14	47%	0	10	6,790	3,395
Bees	9,000	17.65	6%	0		0	450
Mach & equip	23,255	45.60	16%	3,740	MISC	2,954	1,350
Fences	217	0.43	0%	0	10	22	11
Land	1,875	3.68	1%	1,875		0	94
Total	145,597	285.49	100%	5,615		12,174	7,467

ANNUAL SUMMARY OF FINANCIAL INVESTMENT AND CASH FLOW ANALYSIS

Total invest	145,597
DownPayment	19,835
Amt to Finance	125,763
Interest Rate	5%
Months to Finance	60
Monthly Payment	2,373

Payment	Principal	Interest	Balance
Jan	1,849	524	123,913
Feb	1,857	516	122,056
Mar	1,865	509	120,192
Apr	1,872	501	118,319
May	1,880	493	116,439
Jun	1,888	485	114,551
Jul	1,896	477	112,655
Aug	1,904	469	110,751
Sep	1,912	461	108,839
Oct	1,920	453	106,919
Nov	1,928	445	104,991
Dec	1,936	437	103,055
Total	22,707	5,772	

BEE INVESTMENT	
Number of packages(new colonies)	500
Price per package	18.00
Total package costs	9,000
Other costs	0
Other costs	0
Total investment in bees	9,000
Trade in value	0
Annual depreciation	0
Annual interest	450

BUILDING INVESTMENT	
Number of square feet	2,500
Amount per square foot	17.00
Total building value	42,500
Electrical System	300
Air & Heating System	100
Plumbing	200
Truck doors	250
Other costs	0
Other costs	0
Total building investment	43,350
Trade in value	0
Years to depreciate	18
Annual depreciation	2,408
Annual interest	2,168

LAND INVESTMENT	
Land investment	1,875
Other costs	0
Other costs	0
Total land investment	1,875
Trade in value	1,875
Annual depreciation	0
Annual interest	94

FENCE INVESTMENT

Item	# Units	Cost/Unit	Total Cost	Percent of Cost
Roll wire	1.0	15.00	15	7%
Posts	14.0	7.85	110	51%
Insulators	56.0	0.26	15	7%
Fencer	1.0	50.00	50	23%
Labor	5.0	6.00	28	13%
Other	0.0	0.00	0	0%
Other	0.0	0.00	0	0%
Total			217	100%

Total fence investment	217
Trade in value	0
Years to depreciate	10
Annual depreciation	22
Annual interest	11

HIVE INVESTMENT

Item	# Units	Cost/unit	Total Cost	Percent of Cost
Hive Parts				
Hive bottom board	500.0	4.80	2,400	4%
Standard super	2500.0	5.80	14,500	22%
Standard frames	25000.0	0.42	10,500	16%
Standard sheets foundation	25000.0	0.70	17,500	26%
Shallow super	0.0	5.00	0	0%
Shallow frames	0.0	0.40	0	0%
Shallow sheets foundation	0.0	0.70	0	0%
Rabbits	5000.0	0.25	1,250	2%
Inner cover	500.0	3.00	1,500	2%
Outer cover	500.0	3.00	1,500	2%
Entrance reducer	500.0	0.25	125	0%
Queen excluder	500.0	2.00	1,000	2%
Skunk guard	500.0	2.00	1,000	2%
Hive stand	500.0	1.00	500	1%
Colony pallet	500.0	10.00	5,000	8%
Paint	0.0	5.00	0	0%
Wood preservative	0.0	5.00	0	0%
Labor	2500.0	3.85	9,625	14%
Other	0.0	0.00	0	0%
Other	0.0	0.00	0	0%
Other	0.0	0.00	0	0%
Total Hive Parts			66,400	100%
Purchased Colonies	10	150	1,500	
Mating Hives	0	150	0	
Total hive investment	67,900			
Trade in value	0			
Years to depreciate	10			
Annual depreciation	6,790			
Annual interest	3,395			

COLONY ALLOCATION

Total colonies 510

Colony allocation	Number	Percent
Colonies dedicated to honey production	400	78%
Colonies dedicated to pollination services	50	10%
Colonies dedicated to honey & pollination services	60	12%
Colonies dedicated to pollen	0	0%
Colonies dedicated to queen production	0	0%
Colonies dedicated to other	0	0%
Colonies dedicated to other	0	0%
Total Colony Allocation	510	100%

MACHINERY AND EQUIPMENT INVESTMENT

	Replacement Value	Salvage Value	Year Class	Deprec. Value	Annual Depreciation	Annual Interest	
LIGHT GENERAL PURPOSE TRUCK							
Truck	5,000	900	4	4,100		295	
Other	0	0	4	0		0	
Other	0	0	4	0		0	
Total	5,000	900	4	4,100	1,025	295	
Total cost for estimation of repair costs							5,000
HEAVY GENERAL PURPOSE TRUCK & TRAILER							
Heavy Truck	5,000	840	6	4,160		292	
Trailer	2,000	350	6	1,650		118	
Other	0	0	6	0		0	
Other	0	0	6	0		0	
Total	7,000	1,190	6	5,810	968	410	
Total cost for estimation of repair costs							7,000
OTHER MACHINERY & EQUIPMENT							
Extractor	1,700	510	10	1,190		111	
Uncapper	100	0	10	100		5	
Whirl dry or cappings drier	1,200	360	10	840		78	
Brand melter	800	50	10	750		43	
Sump pump tank	500	50	10	450		28	
Honey tanks size 1	620	180	10	440		40	
Honey tanks size 2	0	0	10	0		0	
Boiler	50	0	10	50		3	
Syrup feeder	500	0	10	500		25	
Moving screens	600	0	10	600		30	
Batteries	200	0	10	200		10	
Bee blower	450	0	10	450		23	
Storage containers	1,835	0	10	1,835		92	
Honey gates	100	0	10	100		5	
Honey pump 1	1,500	400	10	1,100		95	
Honey pump 2	0	0	10	0		0	
Tubing	100	0	10	100		5	
Honey filter	500	50	10	450		28	
Honey bottler	500	50	10	450		28	
Pollen traps	0	0	10	0		0	
Forklift	0	0	10	0		0	
Section honey equipment	0	0	10	0		0	
Other	0	0	10	0		0	
Other	0	0	10	0		0	
Other	0	0	10	0		0	
Total	11,255	1,650	10	9,605	961	645	
Total cost for estimation of repair costs							11,255
Totals for Annual Summary:	23,255	3,740		19,515	2,954	1,350	

Expense

This EXPENSE.XLS file contains information on monthly and annual expenses incurred in all operation enterprises.
Expenses must be entered for each enterprise.
Information from this table is linked to the CASHFLOW.XLS

MONTHLY EXPENSES FOR HONEY ENTERPRISE

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Cost	Per Hive	Per lb of Honey
Expenses Excluding Operator Labor																
Sugar																
Granulated	1,125	88	0	0	0	0	1,250	0	0	0	0	0	2,463	6%	4.83	0.04
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	1,125	88	0	0	0	0	1,250	0	0	0	0	0	2,463	6%	4.83	0.04
Medicine																
Antibiotics	27	0	0	0	0	0	0	680	0	0	0	0	707	2%	1.39	0.01
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	27	0	0	0	0	0	0	680	0	0	0	0	707	0	1.39	0.01
Hired labor (prod)	135	18	320	345	466	158	7	146	11	350	350	0	2,306	5%	4.52	0.04
Truck costs (prod)	48	6	256	192	256	160	64	96	48	0	192	0	1,318	3%	2.58	0.02
Containers/labels	0	0	0	0	0	0	4,397	4,397	0	0	0	0	8,794	20%	17.24	0.16
Queens	0	250	0	0	0	0	0	1,250	0	0	0	0	1,500	3%	2.94	0.03
Repairs	1	1	1	1	1	1	1	1	1	1	1	1	11	0%	0.02	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	11	0	11	0%	0.02	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	368	368	0	736	2%	1.44	0.01
Rent	33	33	33	33	33	33	33	33	33	33	33	33	396	1%	0.78	0.01
Office supplies	13	13	13	13	13	13	13	13	13	13	13	13	156	0%	0.31	0.00
Tools	17	17	17	17	17	17	17	17	17	17	17	17	204	0%	0.40	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	88	88	176	0%	0.35	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	500	0	500	1%	0.98	0.01
Real estate taxes	0	0	0	0	0	250	0	0	0	0	0	250	500	1%	0.98	0.01
Advertising	0	0	0	0	0	0	0	0	785	785	0	0	1,570	4%	3.08	0.03
Assoc & conventions	200	0	0	0	0	200	0	0	0	0	0	0	400	1%	0.78	0.01
Lodging (prod)	0	0	240	80	160	160	0	0	0	0	0	0	640	1%	1.25	0.01
Heating, fuel	33	33	33	33	33	33	33	33	33	33	33	33	396	1%	0.78	0.01
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	1,632	458	913	714	979	1,025	5,815	6,666	941	1,600	1,606	435	22,783	52%	44.67	0.40
Operator Labor																
Production	501	61	594	641	897	260	13	561	155	650	650	260	5,242	12%	10.28	0.09
Packing	0	0	0	0	0	0	0	0	0	358	358	0	716	2%	1.40	0.01
Total	501	61	594	641	897	260	13	561	155	1,008	1,008	260	5,958	13%	11.68	0.11
Depreciation and Interest on Investment																
Depreciation													9,548	22%	18.72	0.17
Interest													5,856	13%	11.48	0.10
Total													15,405	35%	30.20	0.27
Total Expenses	2,132	519	1,507	1,355	1,876	1,285	5,828	7,227	1,096	2,608	2,614	695	44,146	100%	86.56	0.78

MONTHLY EXPENSES FOR POLLINATION ENTERPRISE

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Cost	Per Hive	Per lb of Honey
Expenses Excluding Operator Labor																
Sugar																
Granulated	140	10	0	0	0	0	155	0	0	0	0	0	305	4%	0.60	0.01
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	140	10	0	0	0	0	155	0	0	0	0	0	305	4%	0.60	0.01
Medicine																
Antibiotics	4	0	0	0	0	0	0	100	0	0	0	0	104	1%	0.20	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	4	0	0	0	0	0	0	100	0	0	0	0	104	1%	0.20	0.00
Hired labor (prod)	20	3	40	40	20	20	1	20	2	40	40	0	246	3%	0.48	0.00
Truck costs (prod)	48	6	256	192	256	160	64	96	48	0	192	0	1,318	19%	2.58	0.02
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Queens	0	40	0	0	0	0	0	150	0	0	0	0	190	3%	0.37	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	1	0%	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Rent	5	5	5	5	5	5	5	5	5	5	5	5	60	1%	0.12	0.00
Office supplies	5	5	5	5	5	5	5	5	5	5	5	5	60	1%	0.12	0.00
Tools	4	4	4	4	4	4	4	4	4	4	4	4	48	1%	0.09	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	10	10	20	0%	0.04	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	500	0	500	7%	0.98	0.01
Real estate taxes	0	0	0	0	0	100	0	0	0	0	0	100	200	3%	0.39	0.00
Advertising	0	0	0	0	0	0	0	0			0	0	0	0%	0.00	0.00
Assoc & conventions	20	0	0	0	0	20	0	0	0	0	0	0	40	1%	0.08	0.00
Lodging (prod)	0	0	240	80	160	160	0	0	0	0	0	0	640	9%	1.25	0.01
Heating, fuel	5	5	5	5	5	5	5	5	5	5	5	5	60	1%	0.12	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	251	78	555	331	455	479	239	385	69	59	761	129	3,792	54%	7.44	0.07
Operator Labor																
Production	65	50	100	100	150	200	200	200	100	50	50	50	1,315	19%	2.58	0.02
Packing	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	65	50	100	100	150	200	200	200	100	50	50	50	1,315	19%	2.58	0.02
Depreciation and Interest on Investment																
Depreciation													1,194	17%	2.34	0.02
Interest													732	10%	1.44	0.01
Total													1,926	27%	3.78	0.03
Total Expenses	316	128	655	431	605	679	439	585	169	109	811	179	7,033	100%	13.79	0.12

MONTHLY EXPENSES FOR HONEY AND POLLINATION ENTERPRISE	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Cost	Per Hive	Per lb of Honey
Expenses Excluding Operator Labor																
Sugar																
Granulated	140	10	0	0	0	0	155	0	0	0	0	0	305	5%	0.60	0.01
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	140	10	0	0	0	0	155	0	0	0	0	0	305	5%	0.60	0.01
Medicine																
Antibiotics	4	0	0	0	0	0	0	100	0	0	0	0	104	2%	0.20	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	4	0	0	0	0	0	0	100	0	0	0	0	104	2%	0.20	0.00
Hired labor (prod)	20	3	40	40	20	20	1	20	2	40	40	0	246	4%	0.48	0.00
Truck costs (prod)	48	6	256	192	100	50	64	96	48	0	50	0	910	14%	1.78	0.02
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Queens	0	40	0	0	0	0	0	150	0	0	0	0	190	3%	0.37	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	2	0%	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Rent	5	5	5	5	5	5	5	5	5	5	5	5	60	1%	0.12	0.00
Office supplies	5	5	5	5	5	5	5	5	5	5	5	5	60	1%	0.12	0.00
Tools	4	4	4	4	4	4	4	4	4	4	4	4	48	1%	0.09	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	10	10	20	0%	0.04	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	500	0	500	7%	0.98	0.01
Real estate taxes	0	0	0	0	0	100	0	0	0	0	0	100	200	3%	0.39	0.00
Advertising	0	0	0	0	0	0	0	0			0	0	0	0%	0.00	0.00
Assoc & conventions	20	0	0	0	0	20	0	0	0	0	0	0	40	1%	0.08	0.00
Lodging (prod)	0	0	100	80	50	80	0	0	0	0	0	0	310	5%	0.61	0.01
Heating, fuel	5	5	5	5	5	5	5	5	5	5	5	5	60	1%	0.12	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	251	78	415	331	189	289	239	385	69	59	619	129	3,055	46%	5.99	0.05
Operator Labor																
Production	65	50	100	100	150	200	200	200	100	50	50	50	1,315	20%	2.58	0.02
Packing	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	65	50	100	100	150	200	200	200	100	50	50	50	1,315	20%	2.58	0.02
Depreciation and Interest on Investment																
Depreciation													1,432	21%	2.81	0.03
Interest													878	13%	1.72	0.02
Total													2,311	35%	4.53	0.04
Total Expenses	316	128	515	431	339	489	439	585	169	109	669	179	6,680	100%	13.10	0.12

MONTHLY EXPENSES FOR POLLEN ENTERPRISE

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Cost	Per Hive	Per lb of Honey
Expenses Excluding Operator Labor																
Sugar																
Granulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Medicine																
Antibiotics	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Hired labor (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Rent	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Tools	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Real estate taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Assoc & conventions	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Lodging (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Heating, fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Operator Labor																
Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Packing	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Depreciation and Interest on Investment																
Depreciation													0	0%	0.00	0.00
Interest													0	0%	0.00	0.00
Total													0	0%	0.00	0.00
Total Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00

MONTHLY EXPENSES FOR QUEEN ENTERPRISE

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Cost	Per Hive	Per lb of Honey
Expenses Excluding Operator Labor																
Sugar																
Granulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Medicine																
Antibiotics	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Hired labor (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Rent	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Tools	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Real estate taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Assoc & conventions	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Lodging (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Heating, fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Operator Labor																
Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Packing	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Depreciation and Interest on Investment																
Depreciation													0	0%	0.00	0.00
Interest													0	0%	0.00	0.00
Total													0	0%	0.00	0.00
Total Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00

MONTHLY EXPENSES FOR OTHER 1 ENTERPRISE

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Cost	Per Hive	Per lb of Honey
Expenses Excluding Operator Labor																
Sugar																
Granulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Medicine																
Antibiotics	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Hired labor (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Rent	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Tools	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Real estate taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Assoc & conventions	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Lodging (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Heating, fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Operator Labor																
Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Packing	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Depreciation and Interest on Investment																
Depreciation													0	0%	0.00	0.00
Interest													0	0%	0.00	0.00
Total													0	0%	0.00	0.00
Total Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00

MONTHLY EXPENSES FOR OTHER 2 ENTERPRISE

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Cost	Per Hive	Per lb of Honey
Expenses Excluding Operator Labor																
Sugar																
Granulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Medicine																
Antibiotics	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Hired labor (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Rent	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Tools	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Real estate taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Assoc & conventions	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Lodging (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Heating, fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Operator Labor																
Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Packing	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Depreciation and Interest on Investment																
Depreciation													0	0%	0.00	0.00
Interest													0	0%	0.00	0.00
Total													0	0%	0.00	0.00
Total Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00

MONTHLY EXPENSES FOR ALL ENTERPRISES

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Cost	Per Hive	Per lb of Honey
Expenses Excluding Operator Labor																
Sugar																
Granulated	1,405	108	0	0	0	0	1,560	0	0	0	0	0	3,073	5%	6.02	0.05
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	1,405	108	0	0	0	0	1,560	0	0	0	0	0	3,073	5%	6.02	0.05
Medicine																
Antibiotics	35	0	0	0	0	0	0	880	0	0	0	0	915	2%	1.79	0.02
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	35	0	0	0	0	0	0	880	0	0	0	0	915	2%	1.79	0.02
Hired labor (prod)	175	24	400	425	506	198	9	186	15	430	430	0	2,798	5%	5.49	0.05
Truck costs (prod)	144	18	768	576	612	370	192	288	144	0	434	0	3,546	6%	6.95	0.06
Containers/labels	0	0	0	0	0	0	4,397	4,397	0	0	0	0	8,794	15%	17.24	0.16
Queens	0	330	0	0	0	0	0	1,550	0	0	0	0	1,880	3%	3.69	0.03
Repairs	1	1	1	1	1	1	1	1	1	1	1	1	13	0%	0.03	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	11	0	11	0%	0.02	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	368	368	0	736	1%	1.44	0.01
Rent	43	43	43	43	43	43	43	43	43	43	43	43	516	1%	1.01	0.01
Office supplies	23	23	23	23	23	23	23	23	23	23	23	23	276	0%	0.54	0.00
Tools	25	25	25	25	25	25	25	25	25	25	25	25	300	1%	0.59	0.01
Accounting service	0	0	0	0	0	0	0	0	0	0	108	108	216	0%	0.42	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	1,500	0	1,500	3%	2.94	0.03
Real estate taxes	0	0	0	0	0	450	0	0	0	0	0	450	900	2%	1.76	0.02
Advertising	0	0	0	0	0	0	0	0	785	785	0	0	1,570	3%	3.08	0.03
Assoc & conventions	240	0	0	0	0	240	0	0	0	0	0	0	480	1%	0.94	0.01
Lodging (prod)	0	0	580	240	370	400	0	0	0	0	0	0	1,590	3%	3.12	0.03
Heating, fuel	43	43	43	43	43	43	43	43	43	43	43	43	516	1%	1.01	0.01
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0.00	0.00
Total	2,134	615	1,883	1,376	1,623	1,793	6,293	7,436	1,079	1,718	2,986	693	29,630	51%	58.10	0.53
Operator Labor																
Production	631	161	794	841	1,197	660	413	961	355	750	750	360	7,872	14%	15.44	0.14
Packing	0	0	0	0	0	0	0	0	0	358	358	0	716	1%	1.40	0.01
Total	631	161	794	841	1,197	660	413	961	355	1,108	1,108	360	8,588	15%	16.84	0.15
Depreciation and Interest on Investment																
Depreciation													12,174	21%	23.87	0.22
Interest													7,467	13%	14.64	0.13
Total													19,641	34%	38.51	0.35
Total Expenses	2,764	775	2,677	2,217	2,820	2,453	6,706	8,397	1,434	2,826	4,094	1,053	57,859	100%	113.45	1.03

ALLOCATION OF EXPENSES

	Honey	Pollination	Hon & Poll	Pollen	Queen	Other1	Other2
Expenses Excluding Operator Labor							
Sugar							
Granulated	80%	10%	10%	0%	0%	0%	0%
HFCS	0%	0%	0%	0%	0%	0%	0%
Total	80%	10%	10%	0%	0%	0%	0%
Medicine							
Antibiotics	77%	11%	11%	0%	0%	0%	0%
Mite control	0%	0%	0%	0%	0%	0%	0%
Nosema control	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%
Total	77%	11%	11%	0%	0%	0%	0%
Hired labor (prod)	82%	9%	9%	0%	0%	0%	0%
Truck costs (prod)	37%	37%	26%	0%	0%	0%	0%
Containers/labels	100%	0%	0%	0%	0%	0%	0%
Queens	80%	10%	10%	0%	0%	0%	0%
Repairs	78%	10%	12%	0%	0%	0%	0%
Hired labor (pack)	100%	0%	0%	0%	0%	0%	0%
Truck costs (pack)	100%	0%	0%	0%	0%	0%	0%
Rent	77%	12%	12%	0%	0%	0%	0%
Office supplies	57%	22%	22%	0%	0%	0%	0%
Tools	68%	16%	16%	0%	0%	0%	0%
Accounting service	81%	9%	9%	0%	0%	0%	0%
Insurance	33%	33%	33%	0%	0%	0%	0%
Real estate taxes	56%	22%	22%	0%	0%	0%	0%
Advertising	100%	0%	0%	0%	0%	0%	0%
Assoc & conventions	83%	8%	8%	0%	0%	0%	0%
Lodging (prod)	40%	40%	19%	0%	0%	0%	0%
Heating, fuel	77%	12%	12%	0%	0%	0%	0%
Other costs	0%	0%	0%	0%	0%	0%	0%
Other costs	0%	0%	0%	0%	0%	0%	0%
Other costs	0%	0%	0%	0%	0%	0%	0%
Other costs	0%	0%	0%	0%	0%	0%	0%
Items for Cash Flow Analysis							
Beginning cash balance	78%	10%	12%	0%	0%	0%	0%
New capital investment	78%	10%	12%	0%	0%	0%	0%
Down payment (cash)	78%	10%	12%	0%	0%	0%	0%
New long-term borrowing	78%	10%	12%	0%	0%	0%	0%
Monthly long-term principal	78%	10%	12%	0%	0%	0%	0%
Long-term interest expense	78%	10%	12%	0%	0%	0%	0%
Operator labor (production)	67%	17%	17%	0%	0%	0%	0%
Operator labor (packing)	100%	0%	0%	0%	0%	0%	0%
Short-term borrowing	78%	10%	12%	0%	0%	0%	0%
Short-term principal	78%	10%	12%	0%	0%	0%	0%
Short-term interest expense	78%	10%	12%	0%	0%	0%	0%
Depreciation	78%	10%	12%	0%	0%	0%	0%
Interest on investment	78%	10%	12%	0%	0%	0%	0%

Revenue

This REVENUE.XLS file contains information on the revenues obtained from product sales of the operation.

PRODUCT REVENUE	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	% of Ttl Rev
Honey - Honey Enterprise														
Price ($/lb)	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75	0.75	0.75		
Quantity (lbs)	10,600	0	0	0	0	0	0	0	11,000	11,000	11,500	11,000	55,100	
Revenue ($)	7,950	0	0	0	0	0	0	0	8,250	8,250	8,625	8,250	41,325	82%
Honey- Honey and Pollination Enterprise														
Price ($/lb)	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0.60	0.60		
Quantity (lbs)	250	0	0	0	0	0	0	0	250	250	250	250	1,250	
Revenue ($)	138	0	0	0	0	0	0	0	150	150	150	150	738	1%
All Honey														
Quantity (lbs)	10,850	0	0	0	0	0	0	0	11,250	11,250	11,750	11,250	56,350	
Revenue ($)	8,088	0	0	0	0	0	0	0	8,400	8,400	8,775	8,400	42,063	83%
Pollination- Pollination Enterprise														
Price ($/service)	0.00	0.00	25.00	20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Quantity (service)	0	0	50	75	100	0	0	0	0	0	0	0	225	
Revenue ($)	0	0	1,250	1,500	2,000	0	0	0	0	0	0	0	4,750	9%
Pollination- Honey and Pollination Enterprise														
Price ($/service)	0.00	0.00	25.00	20.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Quantity (service)	0	0	50	60	60	0	0	0	0	0	0	0	170	
Revenue ($)	0	0	1,250	1,200	1,200	0	0	0	0	0	0	0	3,650	7%
All Pollination														
Quantity (services)	0	0	100	135	160	0	0	0	0	0	0	0	395	
Revenue ($)	0	0	2,500	2,700	3,200	0	0	0	0	0	0	0	8,400	17%
Pollen														
Price ($/pound)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Quantity (pound)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Revenue ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Queen														
Price ($/queen)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Quantity (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Revenue ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Other 1														
Price ($/unit)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Quantity (units)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Revenue ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Other 2														
Price ($/unit)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Quantity (unit)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Revenue ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Total Revenue ($)	8,088	0	2,500	2,700	3,200	0	0	0	8,400	8,400	8,775	8,400	50,463	100%

Cashflow

This CASHFLOW.XLS file presents the cash flow analysis and summary statistics for the entire beekeeping operation.

CASH FLOW	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Hive	Per lb of Honey
Cash Inflow															
Honey - Honey Enterprise	7,950	0	0	0	0	0	0	0	8,250	8,250	8,625	8,250	41,325	81.03	0.73
Honey - Honey & Pollin Enterprise	138	0	0	0	0	0	0	0	150	150	150	150	738	1.45	0.01
Pollination - Pollination Enterprise	0	0	1,250	1,500	2,000	0	0	0	0	0	0	0	4,750	9.31	0.08
Pollination - Honey & Pollin Enter	0	0	1,250	1,200	1,200	0	0	0	0	0	0	0	3,650	7.16	0.06
Pollen	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Queen	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	8,088	0	2,500	2,700	3,200	0	0	0	8,400	8,400	8,775	8,400	50,463	98.95	0.90
Cash Outflow															
Sugar															
Granulated	1,405	108	0	0	0	0	1,560	0	0	0	0	0	3,073	6.02	0.05
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	1,405	108	0	0	0	0	1,560	0	0	0	0	0	3,073	6.02	0.05
Medicine															
Antibiotics	35	0	0	0	0	0	0	880	0	0	0	0	915	1.79	0.02
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	35	0	0	0	0	0	0	880	0	0	0	0	915	1.79	0.02
Hired labor (prod)	175	24	400	425	506	198	9	186	15	430	430	0	2,798	5.49	0.05
Truck costs (prod)	144	18	768	576	612	370	192	288	144	0	434	0	3,546	6.95	0.06
Containers/labels	0	0	0	0	0	0	4,397	4,397	0	0	0	0	8,794	17.24	0.16
Queens	0	330	0	0	0	0	0	1,550	0	0	0	0	1,880	3.69	0.03
Repairs	1	1	1	1	1	1	1	1	1	1	1	1	13	0.03	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	11	0	11	0.02	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	368	368	0	736	1.44	0.01
Rent	43	43	43	43	43	43	43	43	43	43	43	43	516	1.01	0.01
Office supplies	23	23	23	23	23	23	23	23	23	23	23	23	276	0.54	0.00
Tools	25	25	25	25	25	25	25	25	25	25	25	25	300	0.59	0.01
Accounting service	0	0	0	0	0	0	0	0	0	0	108	108	216	0.42	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	1,500	0	1,500	2.94	0.03
Real estate taxes	0	0	0	0	0	450	0	0	0	0	0	450	900	1.76	0.02
Advertising	0	0	0	0	0	0	0	0	785	785	0	0	1,570	3.08	0.03
Assoc & conventions	240	0	0	0	0	240	0	0	0	0	0	0	480	0.94	0.01
Lodging (prod)	0	0	580	240	370	400	0	0	0	0	0	0	1,590	3.12	0.03
Heating, fuel	43	43	43	43	43	43	43	43	43	43	43	43	516	1.01	0.01
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	729	507	1,883	1,376	1,623	1,793	4,733	7,436	1,079	1,718	2,986	693	29,630	58.10	0.53
Total Cash Flow	7,359	(507)	617	1,324	1,577	(1,793)	(4,733)	(7,436)	7,321	6,682	5,789	7,707	23,905	46.87	0.42
Cash Flow Summary															
Net cash flow	7,359	(507)	617	1,324	1,577	(1,793)	(4,733)	(7,436)	7,321	6,682	5,789	7,707	23,905	46.87	0.42
+Beginning cash balance	0	4,355	1,314	(1,236)	(3,127)	(5,121)	(9,947)	(17,466)	(25,237)	(23,644)	(20,444)	(18,136)	0	0.00	0.00
-New capital investment	145,597	0	0	0	0	0	0	0	0	0	0	0	145,597	285.49	2.58
+Down payment (cash)	19,835	0	0	0	0	0	0	0	0	0	0	0	19,835	38.89	0.35
+New long-term borrowing	125,763	0	0	0	0	0	0	0	0	0	0	0	125,763	246.59	2.23
-Monthly long-term principal	1,849	1,857	1,865	1,872	1,880	1,888	1,896	1,904	1,912	1,920	1,928	1,936	22,707	44.52	0.40
-Long-term interest expense	524	516	509	501	493	485	477	469	461	453	445	437	5,772	11.32	0.10
-Operator labor (production)	631	161	794	841	1,197	660	413	961	355	750	750	360	7,872	15.44	0.14
-Operator labor (packing)	0	0	0	0	0	0	0	0	0	358	358	0	716	1.40	0.01
+Short-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Ending Cash Balance	4,355	1,314	(1,236)	(3,127)	(5,121)	(9,947)	(17,466)	(25,237)	(23,644)	(20,444)	(18,136)	(18,163)	(18,163)	(25.81)	(0.23)
Accumulated Borrowings	123,389	121,016	118,643	116,269	113,896	111,523	109,150	106,776	104,403	102,030	99,656	97,283	97,283	190.75	1.73

SUMMARY OF RETURNS	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Hive	Per lb of Honey
Gross return (cash inflow)													50,463	98.95	0.90
-Total expenses excluding operator labor (cash outflow)													29,630	58.10	0.53
=Operating profit (net cash flow)													20,833	40.85	0.37
-Depreciation													12,174	23.87	0.22
-Interest on investment													7,467	14.64	0.13
=Net Profit													1,192	2.34	0.02
-Operator labor													8,588	16.84	0.15
=Economic profit													(7,396)	(14.50)	(0.13)

Enterprise Analysis Module

This ENTERPR.XLS file presents the cash flow analysis and summary statistics for each enterprise in the entire beekeeping operation.

HONEY ENTERPRISE ANALYSIS

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Enter Hive	Per lb of Honey
Cash Inflow															
Honey	7,950	0	0	0	0	0	0	0	8,250	8,250	8,625	8,250	41,325	103.31	0.73
Total	7,950	0	0	0	0	0	0	0	8,250	8,250	8,625	8,250	41,325	103.31	0.73
Cash Outflow															
Sugar															
Granulated	1,125	88	0	0	0	0	1,250	0	0	0	0	0	2,463	6.16	0.04
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	1,125	88	0	0	0	0	1,250	0	0	0	0	0	2,463	6.16	0.04
Medicine															
Antibiotics	27	0	0	0	0	0	0	680	0	0	0	0	707	1.77	0.01
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	27	0	0	0	0	0	0	680	0	0	0	0	707	1.77	0.01
Hired labor (prod)	135	18	320	345	466	158	7	146	11	350	350	0	2,306	5.76	0.04
Truck costs (prod)	48	6	256	192	256	160	64	96	48	0	192	0	1,318	3.30	0.02
Containers/labels	0	0	0	0	0	0	4,397	4,397	0	0	0	0	8,794	21.99	0.16
Queens	0	250	0	0	0	0	0	1,250	0	0	0	0	1,500	3.75	0.03
Repairs	1	1	1	1	1	1	1	1	1	1	1	1	11	0.03	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	11	0	11	0.03	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	368	368	0	736	1.84	0.01
Rent	33	33	33	33	33	33	33	33	33	33	33	33	396	0.99	0.01
Office supplies	13	13	13	13	13	13	13	13	13	13	13	13	156	0.39	0.00
Tools	17	17	17	17	17	17	17	17	17	17	17	17	204	0.51	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	88	88	176	0.44	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	500	0	500	1.25	0.01
Real estate taxes	0	0	0	0	0	250	0	0	0	0	0	250	500	1.25	0.01
Advertising	0	0	0	0	0	0	0	0	785	785	0	0	1,570	3.93	0.03
Assoc & conventions	200	0	0	0	0	200	0	0	0	0	0	0	400	1.00	0.01
Lodging (prod)	0	0	240	80	160	160	0	0	0	0	0	0	640	1.60	0.01
Heating, fuel	33	33	33	33	33	33	33	33	33	33	33	33	396	0.99	0.01
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	1,632	458	913	714	979	1,025	5,815	6,666	941	1,600	1,606	435	22,783	44.67	0.40
Total Cash Flow	6,318	(458)	(913)	(714)	(979)	(1,025)	(5,815)	(6,666)	7,309	6,650	7,019	7,815	18,542	36.36	0.33
Cash Flow Summary															
Net cash flow	6,318	(458)	(913)	(714)	(979)	(1,025)	(5,815)	(6,666)	7,309	6,650	7,019	7,815	18,542	36.36	0.33
+Beginning cash balance	0	3,956	1,576	(1,792)	(5,009)	(8,746)	(11,892)	(19,581)	(28,670)	(23,377)	(19,596)	(15,447)	0	0.00	0.00
-New capital investment	114,194	0	0	0	0	0	0	0	0	0	0	0	114,194	223.91	2.03
+Down payment (cash)	15,557	0	0	0	0	0	0	0	0	0	0	0	15,557	30.50	0.28
+New long-term borrowing	98,637	0	0	0	0	0	0	0	0	0	0	0	98,637	193.41	1.75
-Monthly long-term principal	1,450	1,456	1,463	1,469	1,475	1,481	1,487	1,493	1,499	1,506	1,512	1,518	17,809	34.92	0.32
-Long-term interest expense	411	405	399	393	387	381	374	368	362	356	349	343	4,527	8.88	0.08
-Operator labor (production)	501	61	594	641	897	260	13	561	155	650	650	260	5,242	10.28	0.09
-Operator labor (packing)	0	0	0	0	0	0	0	0	0	358	358	0	716	1.40	0.01
+Short-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Ending Cash Balance	3,956	1,576	(1,792)	(5,009)	(8,746)	(11,892)	(19,581)	(28,670)	(23,377)	(19,596)	(15,447)	(9,753)	(9,753)	(19.12)	(0.17)
Accumulated Borrowings	96,776	94,915	93,053	91,192	89,330	87,469	85,607	83,746	81,885	80,023	78,162	76,300	76,300	149.61	1.35
Gross return (cash inflow)													41,325	81.03	0.73
-Total expenses excluding operator labor (cash outflow)													22,783	44.67	0.40
=Operating profit (net cash flow)													18,542	36.36	0.33
-Depreciation													9,548	18.72	0.17
-Interest on investment													5,856	11.48	0.10
=Net Profit													3,138	6.15	0.06
-Operator labor													5,958	11.68	0.11
=Economic profit													(2,821)	(5.53)	(0.05)

POLLINATION ENTERPRISE ANALYSIS	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Enter Hive	Per lb of Honey
Cash Inflow															
Honey	0	0	1,250	1,500	2,000	0	0	0	0	0	0	0	4,750	95.00	0.08
Total	0	0	1,250	1,500	2,000	0	0	0	0	0	0	0	4,750	95.00	0.08
Cash Outflow															
Sugar															
Granulated	140	10	0	0	0	0	155	0	0	0	0	0	305	6.10	0.01
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	140	10	0	0	0	0	155	0	0	0	0	0	305	6.10	0.01
Medicine															
Antibiotics	4	0	0	0	0	0	0	100	0	0	0	0	104	2.08	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	4	0	0	0	0	0	0	100	0	0	0	0	104	2.08	0.00
Hired labor (prod)	20	3	40	40	20	20	1	20	2	40	40	0	246	4.92	0.00
Truck costs (prod)	48	6	256	192	256	160	64	96	48	0	192	0	1,318	26.36	0.02
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Queens	0	40	0	0	0	0	0	150	0	0	0	0	190	3.80	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	1	0.03	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Rent	5	5	5	5	5	5	5	5	5	5	5	5	60	1.20	0.00
Office supplies	5	5	5	5	5	5	5	5	5	5	5	5	60	1.20	0.00
Tools	4	4	4	4	4	4	4	4	4	4	4	4	48	0.96	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	10	10	20	0.40	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	500	0	500	10.00	0.01
Real estate taxes	0	0	0	0	0	100	0	0	0	0	0	100	200	4.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Assoc & conventions	20	0	0	0	0	20	0	0	0	0	0	0	40	0.80	0.00
Lodging (prod)	0	0	240	80	160	160	0	0	0	0	0	0	640	12.80	0.01
Heating, fuel	5	5	5	5	5	5	5	5	5	5	5	5	60	1.20	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	251	78	555	331	455	479	239	385	69	59	761	129	3,792	75.85	0.07
Total Cash Flow	(251)	(78)	695	1,169	1,545	(479)	(239)	(385)	(69)	(59)	(761)	(129)	958	19.15	0.02
Cash Flow Summary															
Net cash flow	(251)	(78)	695	1,169	1,545	(479)	(239)	(385)	(69)	(59)	(761)	(129)	958	19.15	0.02
+Beginning cash balance	0	(549)	(910)	(547)	289	1,451	539	(133)	(950)	(1,352)	(1,694)	(2,738)	0	0.00	0.00
-New capital investment	14,274	0	0	0	0	0	0	0	0	0	0	0	14,274	285.49	0.25
+Down payment (cash)	1,945	0	0	0	0	0	0	0	0	0	0	0	1,945	38.89	0.03
+New long-term borrowing	12,330	0	0	0	0	0	0	0	0	0	0	0	12,330	246.59	0.22
-Monthly long-term principal	181	182	183	184	184	185	186	187	187	188	189	190	2,226	44.52	0.04
-Long-term interest expense	51	51	50	49	48	48	47	46	45	44	44	43	566	11.32	0.01
-Operator labor (production)	65	50	100	100	150	200	200	200	100	50	50	50	1,315	26.30	0.02
-Operator labor (packing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Short-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Ending Cash Balance	(549)	(910)	(547)	289	1,451	539	(133)	(950)	(1,352)	(1,694)	(2,738)	(3,149)	(3,149)	0.00 (62.99)	(0.06)
Accumulated Borrowings	12,097	11,864	11,632	11,399	11,166	10,934	10,701	10,468	10,236	10,003	9,770	9,538	9,538	190.75	0.17
Gross return (cash inflow)													4,750	95.00	0.08
-Total expenses excluding operator labor (cash outflow)													3,792	75.85	0.07
=Operating profit (net cash flow)													958	19.15	0.02
-Depreciation													1,194	23.87	0.02
-Interest on investment													732	14.64	0.01
=Net Profit													(968)	(19.36)	(0.02)
-Operator labor													1,315	26.30	0.02
=Economic profit													(2,283)	(45.66)	(0.04)

HONEY AND POLLINATION ENTERPRISE ANALYSIS

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Enter Hive	Per lb of Honey
Cash Inflow															
Honey	138	0	0	0	0	0	0	0	150	150	150	150	738	12.29	0.01
Pollination	0	0	1,250	1,200	1,200	0	0	0	0	0	0	0	3,650	60.83	0.06
Total	138	0	1,250	1,200	1,200	0	0	0	150	150	150	150	4,388	73.13	0.08
Cash Outflow															
Sugar															
Granulated	140	10	0	0	0	0	155	0	0	0	0	0	305	5.08	0.01
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	140	10	0	0	0	0	155	0	0	0	0	0	305	5.08	0.01
Medicine															
Antibiotics	4	0	0	0	0	0	0	100	0	0	0	0	104	1.73	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	4	0	0	0	0	0	0	100	0	0	0	0	104	1.73	0.00
Hired labor (prod)	20	3	40	40	20	20	1	20	2	40	40	0	246	4.10	0.00
Truck costs (prod)	48	6	256	192	100	50	64	96	48	0	50	0	910	15.17	0.02
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Queens	0	40	0	0	0	0	0	150	0	0	0	0	190	3.17	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	2	0.03	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Rent	5	5	5	5	5	5	5	5	5	5	5	5	60	1.00	0.00
Office supplies	5	5	5	5	5	5	5	5	5	5	5	5	60	1.00	0.00
Tools	4	4	4	4	4	4	4	4	4	4	4	4	48	0.80	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	10	10	20	0.33	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	500	0	500	8.33	0.01
Real estate taxes	0	0	0	0	0	100	0	0	0	0	0	100	200	3.33	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Assoc & conventions	20	0	0	0	0	20	0	0	0	0	0	0	40	0.67	0.00
Lodging (prod)	0	0	100	80	50	80	0	0	0	0	0	0	310	5.17	0.01
Heating, fuel	5	5	5	5	5	5	5	5	5	5	5	5	60	1.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	251	78	415	331	189	289	239	385	69	59	619	129	3,055	50.91	0.05
Total Cash Flow	(114)	(78)	835	869	1,011	(289)	(239)	(385)	81	91	(469)	21	1,333	22.22	0.02
Cash Flow Summary															
Net cash flow	(114)	(78)	835	869	1,011	(289)	(239)	(385)	81	91	(469)	21	1,333	22.22	0.02
+Beginning cash balance	0	(456)	(855)	(419)	80	662	(107)	(835)	(1,688)	(1,988)	(2,226)	(3,024)	0	0.00	0.00
-New capital investment	17,129	0	0	0	0	0	0	0	0	0	0	0	17,129	285.49	0.30
+Down payment (cash)	2,334	0	0	0	0	0	0	0	0	0	0	0	2,334	38.89	0.04
+New long-term borrowing	14,796	0	0	0	0	0	0	0	0	0	0	0	14,796	246.59	0.26
-Monthly long-term principal	218	218	219	220	221	222	223	224	225	226	227	228	2,671	44.52	0.05
-Long-term interest expense	62	61	60	59	58	57	56	55	54	53	52	51	679	11.32	0.01
-Operator labor (production)	65	50	100	100	150	200	200	200	100	50	50	50	1,315	21.92	0.02
-Operator labor (packing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Short-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Ending Cash Balance	(456)	(855)	(419)	80	662	(107)	(835)	(1,688)	(1,988)	(2,226)	(3,024)	(3,333)	(3,333)	(55.54)	(0.06)
Accumulated Borrowings	14,516	14,237	13,958	13,679	13,400	13,120	12,841	12,562	12,283	12,003	11,724	11,445	11,445	190.75	0.20
Gross return (cash inflow)													4,388	73.13	0.08
-Total expenses excluding operator labor (cash outflow)													3,055	50.91	0.05
=Operating profit (net cash flow)													1,333	22.22	0.02
-Depreciation													1,432	23.87	0.03
-Interest on investment													878	14.64	0.02
=Net Profit													(978)	(16.30)	(0.02)
-Operator labor													1,315	21.92	0.02
=Economic profit													(2,293)	(38.21)	(0.04)

POLLEN ENTERPRISE ANALYSIS	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Enter Hive	Per lb of Honey
Cash Inflow															
Pollen	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Cash Outflow															
Sugar															
Granulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Medicine															
Antibiotics	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Hired labor (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Rent	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Tools	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Real estate taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Assoc & conventions	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Lodging (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Heating, fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total Cash Flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Cash Flow Summary															
Net cash flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Beginning cash balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-New capital investment	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Down payment (cash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+New long-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Monthly long-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Long-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Operator labor (production)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Operator labor (packing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Short-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Ending Cash Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Accumulated Borrowings	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00

Gross return (cash inflow)	0	0.00	0.00
-Total expenses excluding operator labor (cash outflow)	0	0.00	0.00
=Operating profit (net cash flow)	0	0.00	0.00
-Depreciation	0	0.00	0.00
-Interest on investment	0	0.00	0.00
=Net Profit	0	0.00	0.00
-Operator labor	0	0.00	0.00
=Economic profit	0	0.00	0.00

QUEEN ENTERPRISE ANALYSIS

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Enter Hive	Per lb of Honey
Cash Inflow															
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Cash Outflow															
Sugar															
Granulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Medicine															
Antibiotics	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Hired labor (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Rent	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Tools	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Real estate taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Assoc & conventions	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Lodging (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Heating, fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total Cash Flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Cash Flow Summary															
Net cash flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Beginning cash balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-New capital investment	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Down payment (cash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+New long-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Monthly long-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Long-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Operator labor (production)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Operator labor (packing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Short-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Ending Cash Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Accumulated Borrowings	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00

Gross return (cash inflow)			
-Total expenses excluding operator labor (cash outflow)	0	0.00	0.00
=Operating profit (net cash flow)	0	0.00	0.00
-Depreciation	0	0.00	0.00
-Interest on investment	0	0.00	0.00
=Net Profit	0	0.00	0.00
-Operator labor	0	0.00	0.00
=Economic profit	0	0.00	0.00

OTHER 1 ENTERPRISE ANALYSIS	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Enter Hive	Per lb of Honey
Cash Inflow															
Other 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Cash Outflow															
Sugar															
Granulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Medicine															
Antibiotics	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Hired labor (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Rent	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Tools	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Real estate taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Assoc & conventions	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Lodging (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Heating, fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total Cash Flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Cash Flow Summary															
Net cash flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Beginning cash balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-New capital investment	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Down payment (cash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+New long-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Monthly long-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Long-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Operator labor (production)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Operator labor (packing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Short-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Ending Cash Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Accumulated Borrowings	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00

Gross return (cash inflow)	0	0.00	0.00
-Total expenses excluding operator labor (cash outflow)	0	0.00	0.00
=Operating profit (net cash flow)	0	0.00	0.00
-Depreciation	0	0.00	0.00
-Interest on investment	0	0.00	0.00
=Net Profit	0	0.00	0.00
-Operator labor	0	0.00	0.00
=Economic profit	0	0.00	0.00

OTHER 2 ENTERPRISE ANALYSIS	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Per Enter Hive	Per lb of Honey
Cash Inflow															
Other 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Cash Outflow															
Sugar															
Granulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
HFCS	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Medicine															
Antibiotics	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Mite control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Nosema control	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Hired labor (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Containers/labels	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Queens	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Hired labor (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Truck costs (pack)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Rent	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Tools	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Accounting service	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Real estate taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Advertising	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Assoc & conventions	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Lodging (prod)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Heating, fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Other costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Total Cash Flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Cash Flow Summary															
Net cash flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Beginning cash balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-New capital investment	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Down payment (cash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+New long-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Monthly long-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Long-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Operator labor (production)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Operator labor (packing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
+Short-term borrowing	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
-Short-term interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Ending Cash Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Accumulated Borrowings	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00

Gross return (cash inflow)	0	0.00	0.00
-Total expenses excluding operator labor (cash outflow)	0	0.00	0.00
=Operating profit (net cash flow)	0	0.00	0.00
-Depreciation	0	0.00	0.00
-Interest on investment	0	0.00	0.00
=Net Profit	0	0.00	0.00
-Operator labor	0	0.00	0.00
=Economic profit	0	0.00	0.00

OTHER A.R.M.E. EXTENSION BULLETINS

No. 95-15	Dairy Farm Business Summary Central New York and Central Plain Regions 1994	Stuart F. Smith Linda D. Putnam Charles H. Cuykendall Michael L. Stratton
No. 95-16	Dairy Farm Business Summary Southeastern New York Region 1994	Stuart F. Smith Linda D. Putnam Stephen E. Hadcock Larry R. Hulle Colleen A. McKeon Gerald J. Skoda
No. 95-17	Dairy Farm Business Summary Eastern Plateau Region 1994	Robert A. Milligan Linda D. Putnam John S. Carlson Carl A. Crispell Karen Hoffman
No. 95-18	Dairy Farm Business Summary Northern Hudson Region 1994	Stuart F. Smith Linda D. Putnam Cathy S. Wickswat Anita W. Deming David R. Wood
No. 95-19	Dairy Farm Business Summary Eastern New York Renter Summary 1994	Stuart F. Smith Linda D. Putnam
No. 95-20	Seneca County's Local Governments: Opportunities for Intergovernmental Cooperation, Needs for Educational and Technical Assistance	David Kay Duane Wilcox
No. 95-21	Farm Income Tax Management and Reporting Reference Manual	Stuart F. Smith Charles H. Cuykendall
No. 95-22	Income Tax Implications for Farmers Receiving New York City Watershed Agricultural Program Payments	John M. Thurgood
No. 95-23	New York Economic Handbook 1996 Agricultural Situation and Outlook	A.R.M.E. Staff