

Beginnings of a National Organic Research Agenda

Based on results from breakout sessions during the Inaugural Assembly of SCOAR (Jan. 2001)

Breeding and Genetics

Plant crops:

- Generate goals for breeding crop traits by the end users, organic producers. Some goals would include: disease and insect resistance, good yield in a diverse system, compatibility with intercrops, good response to organic fertility sources
- Breeding needs to be conducted in an organic system to identify varieties that have optimal production in such systems.
- Include breeding work on minor crops that fill niche markets
- Develop mechanisms for preventing/eradicating genetic contamination: breeding non-compatibility genes into organic corn varieties that would prevent them from accepting pollen from GM hybrids (Walter Goldstein's idea); methods to "breed out" GM traits
- Breed for horizontal resistance: traits determined by combinations of genes
- Keep public access to germplasm
- Develop seed-saving networks to maintain heirloom varieties, regionally adapted varieties, and seed purity.
- Work with wild relatives and landraces of crop plants to identify useful traits and to preserve diversity

Policy issues: liability for genetic contamination must be assigned to the originators of novel gene combinations

Livestock:

- Breed livestock for uses beyond meat/dairy production: system uses (?)
- Breed specifically for organic systems
- Preserve traditional livestock varieties
- Identify traits, i.e. animal resistance breeding, that are not utilized in conventional systems (?)

Health and Quality of Organic Products

Crops

- In general, to look at how soil quality affects plant quality affects nutrition and taste in food.
- How flavor differs in organic and conventional crops, particularly vegetables. "Sensory analysis": flavor, texture, taste, color, fragrance
- How nutrient levels differ between organic and conventional crops. Relationship, if any, between taste and nutrient profile. Hypothesis: taste differences that people sense are related to biochemical processes in the plants, which in turn are influenced by farm management style (organic or conventional)
- Long-term soil nutrient and crop nutrient profiles under conventional and organic management.
- Why taste/nutrient levels are different between organic and conventional crops. Is it slow nitrogen release through the growing season? Is it microbial activity in the soil? Is it plant manufacture of secondary compounds?
- What is the relationship between nutrients in the soil and nutrients in the food grown on that soil?
- What mediates nutrient dynamics in the soil? Soil food web dynamics; using new soil assay tools to measure this and the preceding topic. Look at soil chemistry as well as biology.
- How does crop variety influence nutrient level?
- How does production method influence nutrient level?
- Document soil differences between organic and conventionally managed orchards, specifically worm population sizes
- Differences in European corn borer damage in organic and conventional cornfields: does this suggest difference in nutrient levels or quality of the corn?
- Related but different: if Roundup kills plants by shutting down the shikimic acid pathway, might RR soybeans not have the phenylalanine created by the pathway and thus be more susceptible to disease?

Livestock

- Use livestock reproductive studies to compare the quality of organically and conventionally produced feeds
- Study biochemical composition of meat produced in different production systems
- Taste differences in conventionally and organically produced meat
- Why does the hide come off organically-raised animals easier than conventionally-raised animals?

- Effects of pelletized and supplementary feed on animal manure, and on the soil
- Effects of ultra-pasteurization process on milk nutritional quality
- Optimizing pastured beef, hog, and poultry production
- Difference in multiple antibiotic resistance between hogs raised in different production systems (organic compared with confinement): cross-sectional sample of pastoral hog operations compared with local confinement operations
- Probiotic research, looking into the potential to replace pathogenic microbes with beneficial ones, in guts, on crop surfaces, in water, etc. Phospholipid fatty acid (PLFA) analysis and DNA fingerprinting are new tools that can be used for this work.

NB: the group decided that work on pesticide residues was beyond the topic, though Benbrook stated that it would be worthwhile to look into the long-term soil and human health effects of applying organically acceptable pesticides such as sulfurs, petroleum oils, copper fungicides, and botanicals.

Methods: The group brought forth that, in order to generate usable data in a short period of time, cross-sectional studies needed to be done, so that replication is done by location rather than over time. Also, they felt it would be a good idea to choose a few important fruit and vegetable crops to focus on initially in order to see any obvious differences. Suggestions were strawberries, tomatoes, apples, lettuce, and potatoes.

Information Management and Dissemination

Review and make accessible to farmers relevant historical literature.

Publish case studies.

Develop database of experts/expertise in organic; contacts for each state.

Need another "New Farm" magazine for organic farmers.

National conference in 2002 & publish proceedings.

Websites that are systems-oriented, rather than component-oriented.

Develop consistent set of terminology for organic, to facilitate info searches.

Listserv for SCOAR participants.

Economics, Marketing & Social Issues

Define & document social benefits of organic farming regionally.

Provide better info on farm-level strategies: CSAs, co-ops, value-added.

Profitability of different organic cropping systems vs. conventional – validation.

Articulate vision of Ag system that was organic and sustainable, for labor, environment, communities, and food supply.

What are the real costs of producing food? Document externalities and compare organic.

Develop better info on (potential) organic demand.

Facilitate local institutional purchasing for organics.

Infrastructure to enable farmer/customer contacts.

Document scope or organic sector and detailed quant. breakdown of supply, demand, prices, flows, econ. impacts.

Educate lenders.

Identify market barriers for organic growers & how to overcome.

Soils

Soil microbe communities: functional ID for farmers and how they relate to production/performance.

"Management" of microbial dynamics to enhance nutrient cycling.

What is best use of microbial system research for farmers?

Compendium of useful literature for farmers.

Develop specialized extension services for soil microbio management.

Regional "soil food web" labs and research teams.

Crop rotation effects on microbio and results for crop health.

Effects of soil management on changes in plant phytochemicals/nutrition.

Microbial product testing: replicated across farms; validation and demonstration.

Microbio management to minimize amendments.

Nutrient balancing budgets/cycling in organic systems.

Investigate fringes: biodynamics, rock powders, "subtle energies" etc.

N cycle modeling for diff. Organic systems.
Disease suppression of soil management strategies.