

Transition to Organic Vegetable Production by Large-Scale Conventional Farmers

Louise Jackson (Research and Education Grant Program)

Project Number: SW01-057

Title: Transition to Organic Vegetable Production by Large-Scale Conventional Farmers

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Hideomi Minoshima and Maria Taylor gather samples for the project. – Photos by Louise Jackson and Sean Smukler

Participants:

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Liese Murphree, Lecturer, California State University, Monterey Bay

Richard Smith, Farm Advisor, UC Cooperative Extension, Salinas

Sean Smukler, Graduate Student, UC Davis

Ron Yokota, Ranch Manager, Tanimura and Antle Inc.

SARE Grant: \$123,399

Situation:

Organic production has increased in the Salinas Valley, the nation's largest producer of cool-season vegetables like lettuces, cole crops, and celery. As large-scale growers convert some of their land to organic production, questions arise about making the transition.

Tanimura and Antle Inc., a large vegetable production company in Salinas Valley, is committed to growing organic produce on hundreds of acres. The company agreed to participate with University of California researchers and farm advisors in a farm-scale research project on two of its ranches, Storm Ranch and Daugherty Ranch, in Salinas. The project is designed to meet grower needs and develop new scientific information on ecological changes during organic transition.

Objectives:

- Monitor changes in crop species and yield, soil organic matter and microbiology, diseases, insects, and weeds during the three-year organic transition
- Design experiments to target specific management and pest problems as they arise
- Track changes in agronomic management, economic issues, and decision-making
- Disseminate findings via field days, public meetings, workshops, and publications

Actions

Certified organic practices were instated at two Tanimura and Antle ranches in 2000, and permanent sampling points were set up for frequent monitoring:

- 3 transects on each of 9 lots, each transect a 2-bed strip across the entire field
- 3 equidistant permanent sampling points (± 5 m) along each transect
- 81 sampling points total – 54 on Storm Ranch, 27 on Daugherty Ranch

The plots were sampled in June 2000 and re-sampled periodically for:

- Soil Characteristics
 - Total carbon and nitrogen
 - Potentially mineralizable N
 - Microbial biomass
 - Nitrate
 - Ammonium
 - Available phosphorus
 - Physical properties
- Plant Characteristics
 - Biomass
 - Nutrient content
 - Mycorrhizal colonization



These Tanimura and Antle baby greens are being grown under traditional methods.



Compost is applied during the organic transition trials.

- Diseases
- Insects
- Weeds

A total of 510 individual plots on 47 sampling days were sampled, and 25 different crop and cover crop species were assessed.

Management regimes:

- Historic – Lettuce, broccoli, spinach, and celery planted in blocks of 20-30 acres with frequent inputs of inorganic fertilizers and pesticides
- Organic – Diversified into smaller parcels of baby greens, leaf lettuce, radicchio, endive, escarole, fennel, cilantro, and parsley with inputs of compost, chicken manure pellets, cover crops, and organic-approved soluble fertilizers

Two types of compost were applied at Storm Ranch at 7 yards per acre:

- Commercial grade (75% yard waste plus manure and lime)
- High grade (30% yard waste plus cow manure, clay, finished compost, and baled straw)



Participants learn about the project during a field day.

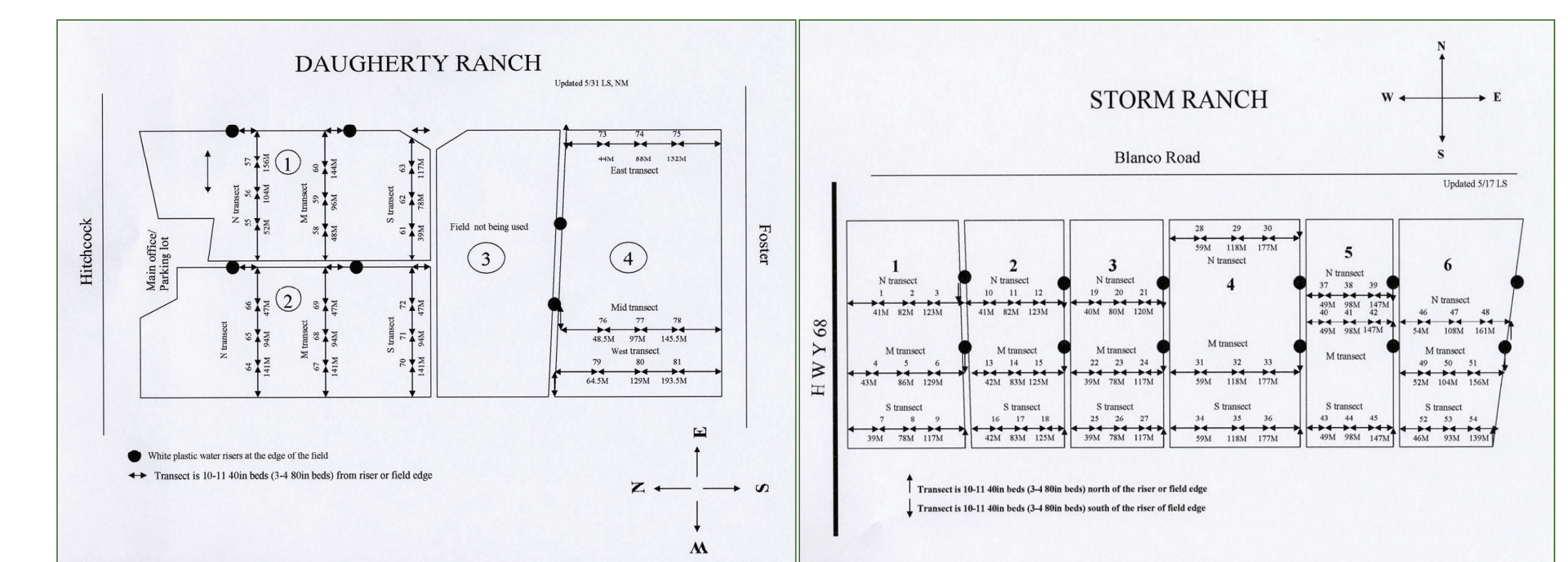
Results:

Soil analyses showed low concentrations of nitrate and ammonium through the three-year study. Nitrate was often close to zero, even though N concentrations in plant tissue were more than adequate.

Soil microbial biomass, total soil carbon, and mycorrhizal colonization – all indicators of improving soil quality – increased at Storm Ranch. Daugherty Ranch, with higher soil clay content, showed more variation.

Pest damage and weeds did not increase during the transition period at either ranch.

Few differences were observed in compost treatments; commercial compost is 25% less expensive than high-grade compost and may alleviate problems caused by manure, such as salinity.



Potential Benefits:

The project found that transition from conventional to organic vegetable can be done without large risks. But it does require careful planning and implementation of methods that require capital and labor, like drip irrigation and hand weeding.

Other key outcomes:

- Environmental quality is enhanced by organic transition:
 - soil carbon pools can increase
 - nitrate leaching potential can decline
 - pesticides are no longer applied
- Organic fields, set amid a non-organic environment, did not become oases for large populations of nearby pests
- The organic transition was 'uneventful,' in the words of Ron Yokota of Tanimura and Antle, the result of deliberate planning and monitoring

More than 30 presentations on organic transition were made to a variety of audiences, widely disseminating project results. More than 20 students were involved in the project, learning sampling design, field and laboratory skills, and participatory research with farmers.

Smukler, S.M., L.E. Jackson, L. Murphree, R. Yokota, S.T. Koike, and R.F. Smith. 2008. Transition to large-scale organic vegetable production in the Salinas Valley, California. *Agriculture, Ecosystems and Environment* 126:168-188.

<http://groups.ucanr.org/jacksonlab/files/52509.pdf>