Development of No-Till High Tunnel Best Management Practices

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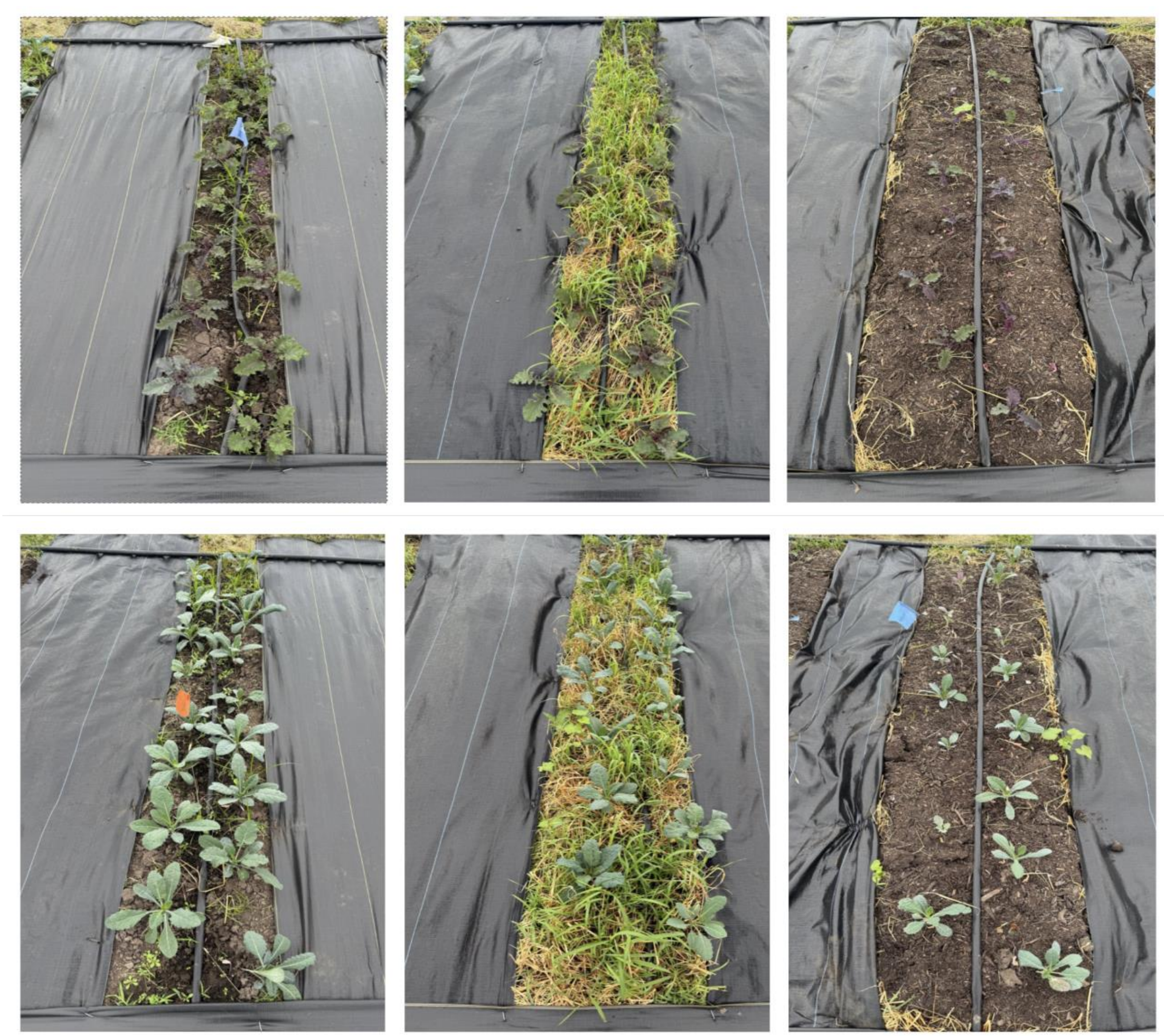
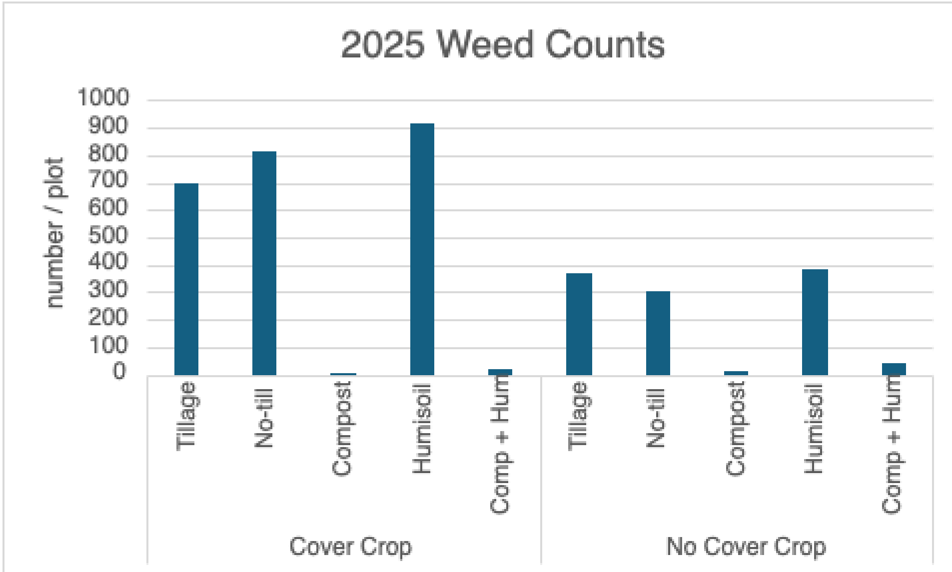
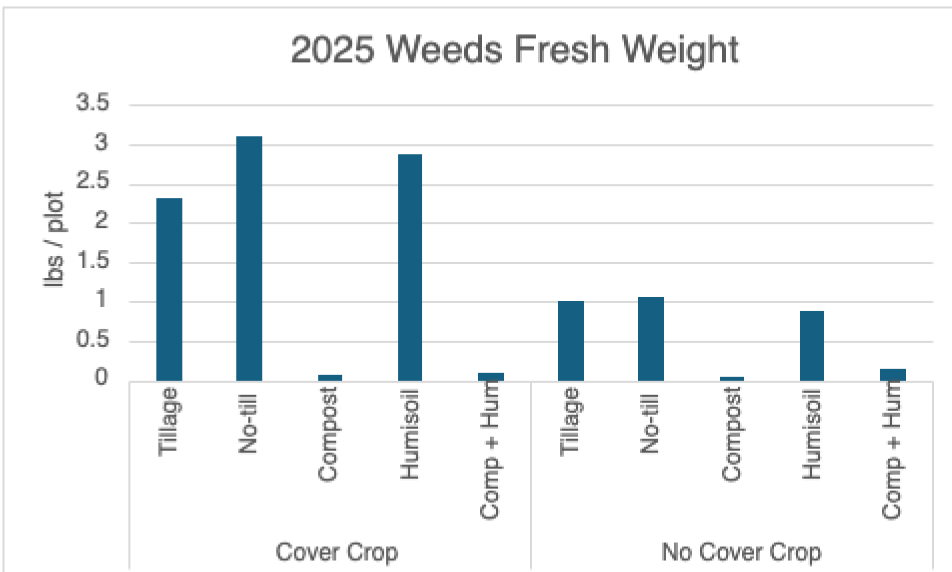
Many growers are interested in adopting no-till soil management practices, particularly in high tunnels where soil health can be a challenge. Weed management can be very difficult in organic no-till systems where limited tools are available. This study was initiated to understand what practices should be adopted when transitioning to no-till management systems. The utilization of rye cover crop, deep-bed compost applications, and Humisoil were tested for the production of Kale. The trial was conducted in a certified organic high tunnel and was planted on 15 May 2025. Cover crop was terminated with occultation.



Control Cover Crop CC + Compost





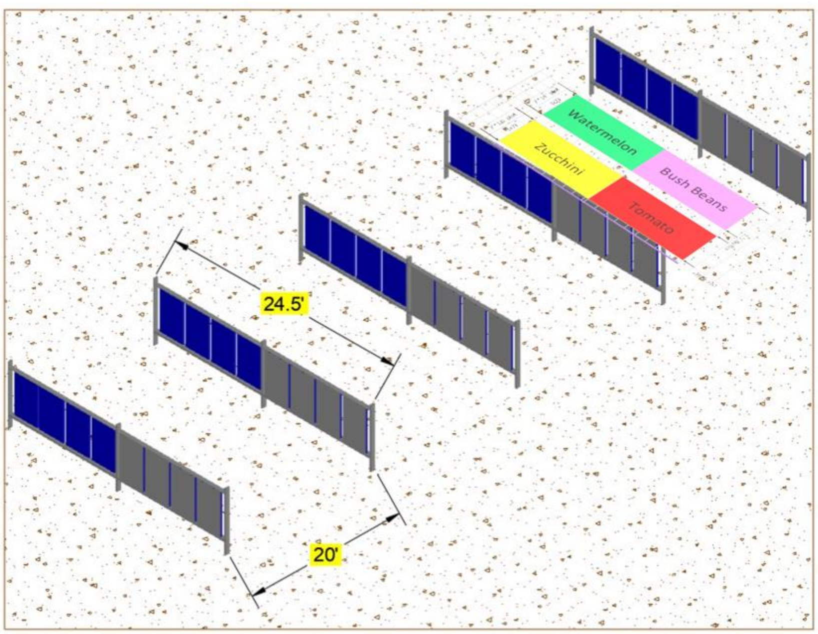
Crop productivity is currently being measured for red and green kale varieties. The preliminary results of the weed study suggest that the application of compost was very effective at smothering out early-season weeds. Further studies that identify the nutrient availability will be important for understanding the dynamics of no-till production in high tunnels. Previous studies with cover crops indicate that nutrient cycling and subsequent availability is oftentimes increased in the high tunnel, probably due to the warmer soil temperatures. As growers transition to no-till practices for vegetables, identifying strategies for weed management will be critical for success.

Feasibility of Small- and Urban-Farm Agrivoltaics

Agrivoltaics, or Agriphotovoltaics ("APV") is the combined land-use of both agriculture and photovoltaic power production. In our case, the agriculture being conducted is the cultivation of vegetable crops, but agrivoltaics can include livestock, beekeeping and/or agronomic crops.

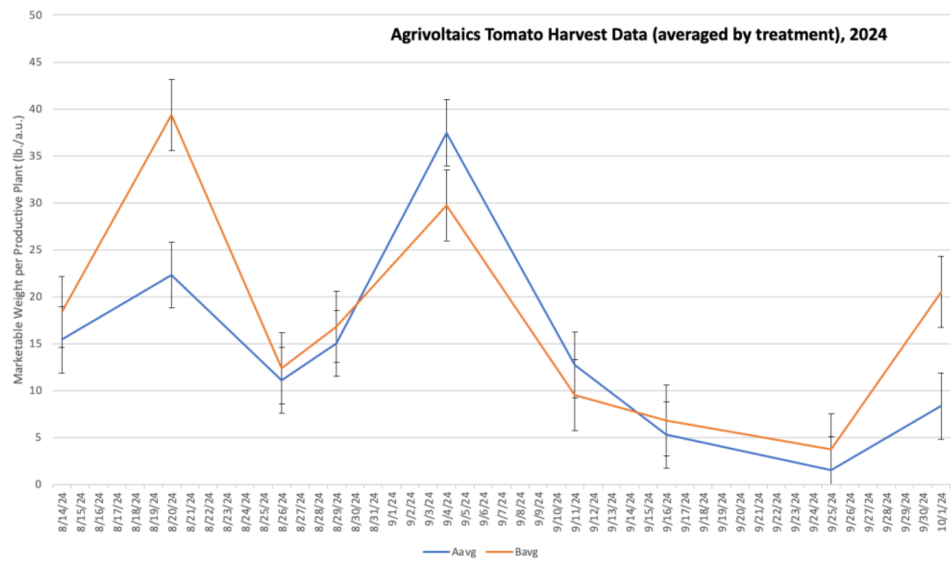
- APV benefits both solar energy production and agricultural yields.
- OHREC's APV research focuses on utility-, mid-, and small-scale APV applications.
- Objectives:
  - Assess APV's impact on vegetable crops
    - Viability of growing cool and warm-season crops under solar panels (beets, spinach, lettuce, tomato, watermelon, bush beans, and zucchini)
    - Impact on marketability and quality
  - Determine economic feasibility for small-scale growers
    - Enterprise budgets to be developed for the most successful crops
    - Cash flow, rate of return, and impact of solar array size on profitability

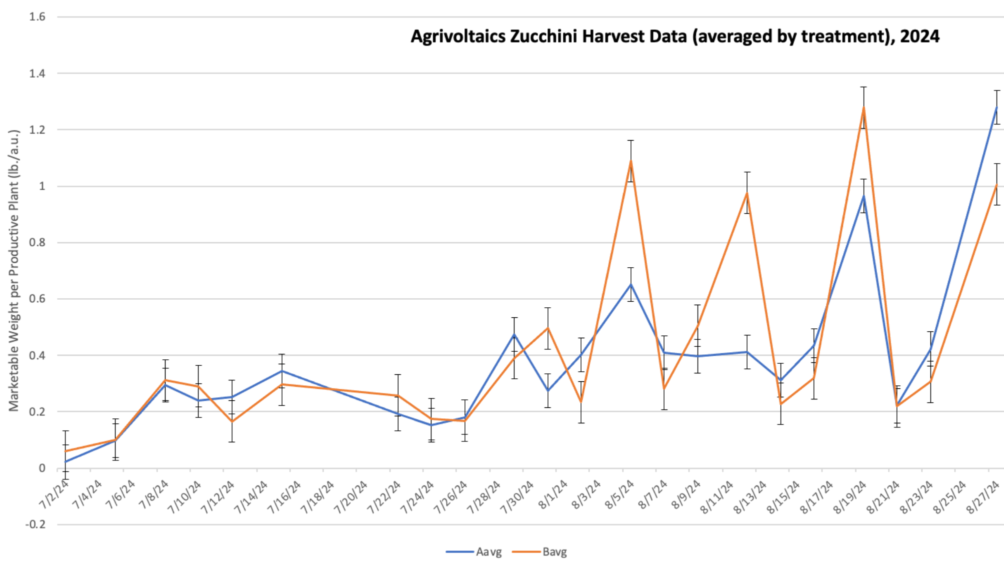
OHREC APV Study Design – 14 kW solar array



Early results point to viability – with this array design and crops tested

Crop marketability and quality results show similarity among groups so far (A=APV plots, B=control), except for watermelon, where watermelon A had higher visual quality ratings and firmness levels.





Light Studies

- Light environments were characterized at two studies at mid-scale utility solar power generation sites throughout Eastern Kansas, and one at our own OHREC Agrivoltaics research facility.
- Sensors were placed approximately 2.5' above the ground surface to generally mimic mature plant canopy height, across the expected light-treatment area, to collect continuously the PAR (Photosynthetically-Active Radiation) available at the sensor locations, recording averages at 10- or 15-minute intervals.
- 13% decrease in DLI between control and APV areas at Stull Farm
- 18% decrease in DLI between control and APV plots at OHREC

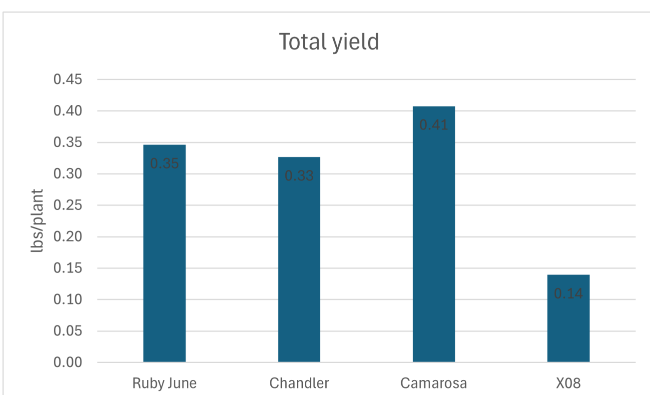
Production of June Bearing Strawberries in Kansas

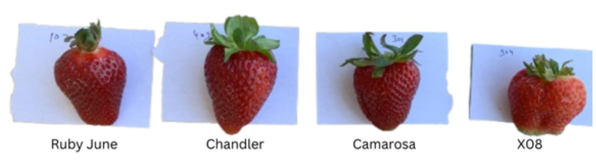
Experiment 1. Evaluation of strawberry cultivars for growth, yield, nutritional quality and shelf life.

Materials and Methods

- **First trial (2024-25)**: Four cultivars **(Ruby June, Chandler, Camarosa, and XO8)** were planted in a randomized complete block design (RCBD).
- Each cultivar had four replications with 30 plants per replication.
- Planting system: Annual plasticulture, with two rows per raised bed, 15 inch spacing between plants within a row, and 12 inch spacing between rows.
- Planting date: August 26, 2024.
- Harvesting period: May 6 to June 2, 2025.
- Pre-harvest observations: Plant health, plant dry matter, canopy diameter, and plant height.
- Post-harvest observations: Fruit weight, fruit number, total soluble solids (TSS), titratable acidity (TA), pH, firmness, shelf life, anthocyanins content, antioxidant potential, and total phenolic content.
- **Second trial (2025-26)**: Twelve cultivars **(Ruby June, Chandler, Camarosa, XO8, Camino Real, Fronteras, Renewal, Victory, Keystone, Monarch, Surfline, and SB_14.028-025)** will be evaluated following the same experimental design and management practices.

Preliminary Results





Experiment 2. Evaluation of the effect of late planting and row covers on yield, nutritional quality and shelf life

Materials and Methods

- **First trial (2024-25):** 'Ruby June' was planted in a randomized complete block design (RCBD) with four replications and 30 plants per plot.
- Treatments: Five treatments were established based on planting date and row cover use: August 26 (no cover), September 9 (no cover), September 9 (with row cover), September 23 (no cover), and September 23 (with row cover).
- The treatments that had row cover (September 9 and September 23), were immediately covered after planting and the covers were maintained for two weeks.
- **Row covers**: Floating row covers made of spunbonded polypropylene (1.2 oz/yd^2, considered medium to heavyweight) were used.
- Planting system and data collection: The planting system, pre-harvest parameters (plant health, plant dry matter, canopy diameter, plant height), and post-harvest parameters (fruit weight, fruit number, TSS, TA, pH, firmness, shelf life, anthocyanin content, antioxidant potential, and total phenolic content) were the same as described in Experiment 1.
- **Second trial (2025-26):** A second trial will be conducted following the same experimental design and procedure as the first trial.

Preliminary Results