

GEARING UP FOR SPECIALTY CROPS: EQUIPMENT NEEDS FOR SMALL TO LARGE OPERATIONS

Kansas Rural Center's
Farm and Food Conference
November 2018

David Coltrain
620-330-3951
coltraindavid@gmail.com

Agenda

- ▣ Questions for Attendees
- ▣ Specialty Crops Growing Experience
- ▣ Types of Operations
- ▣ Pre-plant, Soil Preparation
- ▣ Planting and Growing
- ▣ Harvest, Post Harvest (storage), Marketing
- ▣ High Tunnel Specialized Equipment

Questions

- ▣ How many years have you been producing and marketing vegetables and fruits?

- ▣ Rate your experiences about equipment needs
 - 1 (very happy) 3 (okay) 5 (wish more info available)

- ▣ Do you enjoy finding equipment?

My Experience

- ▣ Over 20 years produced and marketed vegetables in SE Kansas with up to 60 acres (purchased equipment 2 times)
- ▣ 1994: Put up a High Tunnel
 - Wow! This is great!
- ▣ 1999: Masters in Ag Economics
 - Thesis included: “What is necessary for Kansas to produce more vegetables?”
 - 2015 -2016: Appointed by Gov. Brownback to Task Force on Local Foods
- ▣ 2015 -2017: SCCC Agriculture Instructor and Specialty Crops Development (2 Greenhouses, 4 High Tunnels, 4-acre outside plots) (purchased equipment: all new, unlimited funds)
- ▣ 2018 - : Back home in SE KS (Cherryvale) (purchasing equipment)

Background

- ▣ Types of Specialty Crops
- ▣ Size of operation
- ▣ Vegetable Grower Specialty
- ▣ System approach (conventional, no-till, natural, organic)
- ▣ Importance of various enterprises
 - Important part of income
 - Addition to Farm Business
 - Supplemental income
 - Retirement income
- ▣ Character Traits

Types of Specially Crops

- ▣ **Specialty crops** are **defined** as fruits and vegetables, tree nuts, dried fruits, and horticulture and nursery **crops**, including floriculture. **Specialty crops** are **plants** that are intensively cultivated.
 - Labor vs. Equipment
- ▣ Vegetables (annual production)
- ▣ Small Fruits (perennial production, 4-10 years)
- ▣ Tree Fruits (perennial production, 5-20 years)

Size of Operation

- ▣ Small Acreage Grower
 - Up to 4 acres
- ▣ Medium Acreage Grower
 - 3 - 15 acres
- ▣ Large Acreage Grower
 - 10 - 100 acres or more
- ▣ High Tunnel

Vegetable Grower Specialty

- ▣ Local or Direct Market
- ▣ Wholesale market, small scale
- ▣ Wholesale market, large scale

- ▣ SCCC Demonstration Garden
 - Over 50 vegetable species, 15 fruit species

SCCC STEM Grant



Commodity Crops vs. Specialty Crops

- ▣ Less variety
- ▣ Economies of scale
- ▣ Example about two twins attending K-State

Operation Distinctions

- ▣ Pre-plant, soil preparation
- ▣ Planting and growing
- ▣ Harvest, post-harvest (storage), marketing

Large (Expensive) Equipment

- ▣ Tractors
 - Minimum 20-40 hp
 - Josh, “Dad, why don’t we get a larger tractor?”
 - # of tractors
 - Meier’s Farm (Topeka) in 1970’s
 - 13 tractors each hooked to a different implement
 - Medium and Large farms benefit from a larger tractor (70 hp)
- ▣ Rototiller (rear tine)
 - Europe called “tractors”
- ▣ Trucks for harvest and/or marketing

Pre-plant, Soil Preparation

Major Tillage



- ▣ Chisel Plow
- ▣ Moldboard Plow
- ▣ Disk Plow
- ▣ Hire it done



Secondary Tillage

- ▣ Field Cultivator
- ▣ Disk
- ▣ Spring tooth
- ▣ Dust bowl consequences



Roto tiller

- ❑ Backyard gardeners
- ❑ Destroys soil structure
- ❑ Potential for hardpan
- ❑ May have to rip soil
- ❑ Relatively expensive
- ❑ Try to avoid using a rototiller



No-till Operations

- ▣ No-till drill
- ▣ Crimper
- ▣ Cover crops can become weeds and weeds are decent cover crops
- ▣ Boom Sprayer
 - Economics: No-till trades herbicide use for tillage expense



Fertilizer Spreaders

- ❑ In general, specialty crops need less fertilizer than commodity crops
 - Soybeans, grass vs. broadleaf crops
- ❑ Small acreage farmers can use low cost methods
- ❑ Medium and large farmers have to use higher cost equipment
- ❑ Fertigation is possible



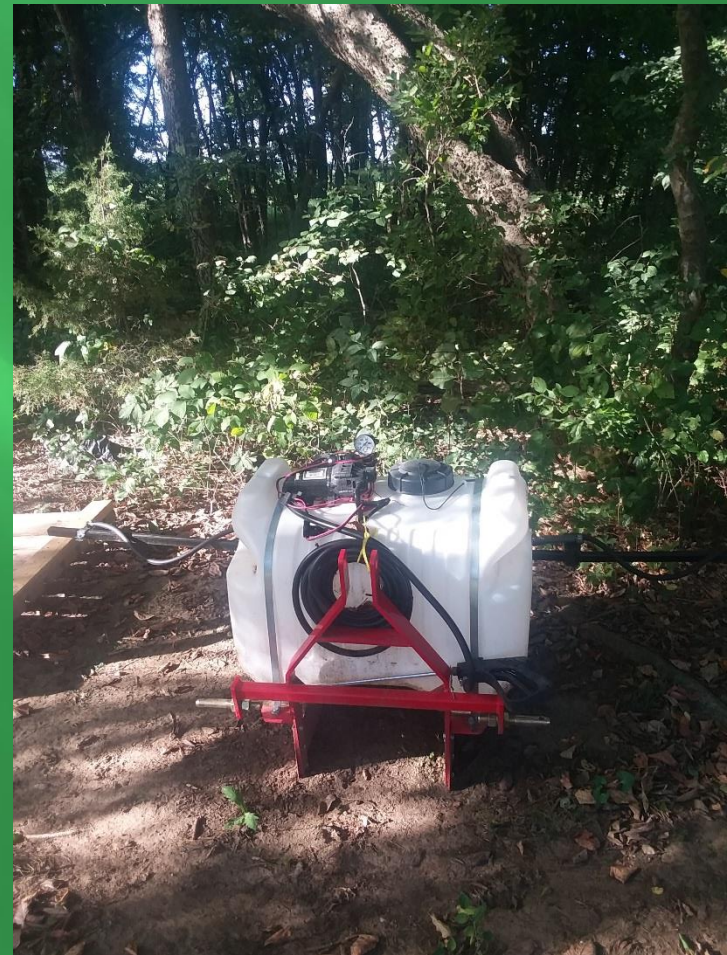
Irrigation

- ▣ Very important for high value crops
- ▣ Numerous ways to address
- ▣ Research shows that drip irrigation is most efficient and “standard”



Boom Sprayer

- ▣ Pest control
 - IPM course listed 7 categories of pests and about 6 ways to control
 - “High value crops spray for insects and diseases before unmarketable”
- ▣ Weed control with pre-emergent herbicides



Back Pack Sprayers



- ▣ Cover large areas
- ▣ Small Acreage
Grower can get a lot done
- ▣ Suggestion: multiple sprayers to cut down on cleanup time

Year End Clean-up

Tractor Rotary Mower



- ▣ Needed for clean up at year end
- ▣ Some crops more critical (corn, okra, weeds?)
- ▣ Mower can be decent weed control tool at times during growing season

Plastic Mulch Removal

- ❑ Least favorite thing to do on our vegetable operation
- ❑ Biodegradable plastic



Planting and Growing

Raised Bed, Drip Tape, Plastic Mulch



- ❑ Critical piece of equipment
- ❑ Learned about plastic mulch advantages around 1970
- ❑ First “plastic layer” homemade
- ❑ Wouldn't try to raise specialty crops without this type of implement

Transplanters

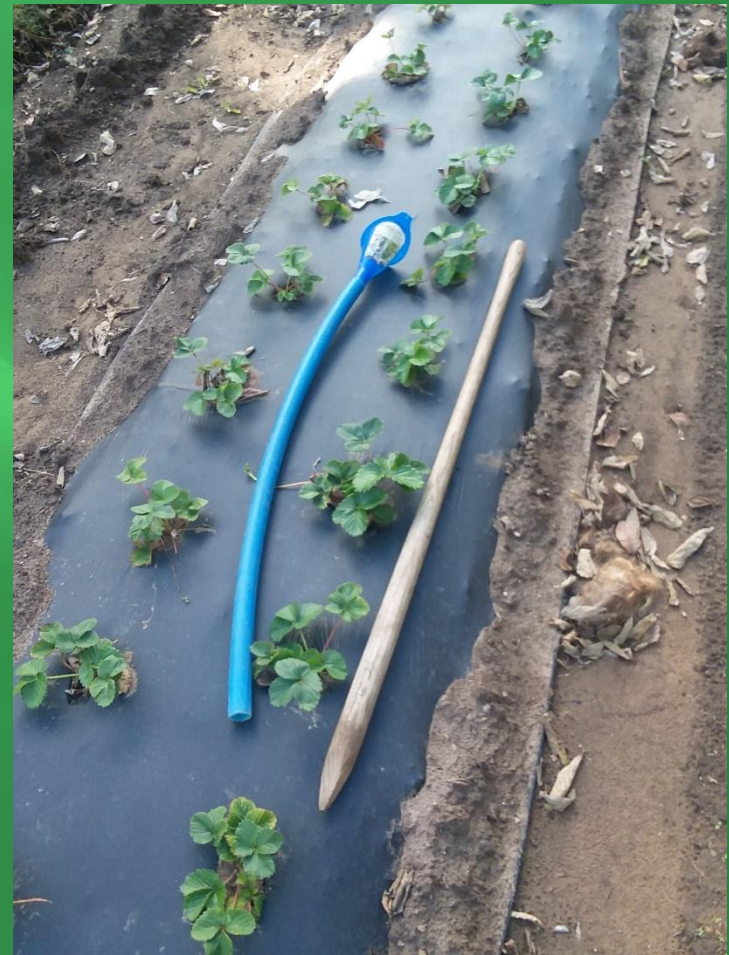


- ▣ 20,000 plants/day
- ▣ Water wheel system
- ▣ Bare soil, “tobacco planter”
 - Good for strawberries, cabbage family, anything that doesn't do better with plastic mulch
- ▣ Other types of transplanters



Low Cost Transplanting

- ▣ Hole punch
- ▣ Watering pipe
- ▣ One individual can transplant 1-2000 per day
- ▣ At SCCC only used transplanter if over 500 plants



Planting Large Seed Species

- ▣ Crops like corn, beans, peas, even pumpkins often planted with conventional type of planter



Precision Planter (Tiny Seeds)



- ▣ Salad crops: lettuce, brassica family, spinach,
- ▣ Root crops: radish, turnips, carrots, beets, etc.
- ▣ Many different types, all rather expensive

2 Row Lister

- ❑ Makes furrow to plant potatoes or other crops
- ❑ Produces raised bed for sweet potatoes
- ❑ Digs potatoes, sweet potatoes



Weed Control

- ▣ Separates “good managers from not so successful”
 - How many backyard gardeners mention they planted a garden, but the weeds took over
- ▣ IPM Class: 70% of labor in underdeveloped agriculture is to control weeds
- ▣ Have to plan for weed control

One Wide Row Cultivator

- ▣ Plastic mulch
- ▣ About 4 feet space to not tear up plastic mulch



Two Row Cultivator

- ▣ “Ferguson” cultivators
- ▣ Old equipment is disappearing, sometimes at auctions the winning bid goes for scrap metal



Row Cultivators



- ❑ Old, small tractors used for precise row cultivation
- ❑ Trips through Iowa in the past
- ❑ Liberal John Deere dealership



Miscellaneous

- ▣ Garden Tools
- ▣ Specialty Crops grower should be more knowledgeable and use more specialized equipment, but in many ways: “just a large garden”

Pesticide Application

- ▣ IPM approach
 - About 6 methods for pest (7) control
 - Try everything else, then use pesticides
 - High value crops, pesticides first thing
- ▣ Blaster sprayer
- ▣ Back pack sprayers
- ▣ Boom sprayers



Miscellaneous

- ▣ Support systems for number of crops
 - Tomatoes, peppers, cucumbers, etc.
- ▣ More supplies than equipment, but investment will add up
 - Example: Bramble trellis systems

Harvest, Post-harvest (storage), Marketing

Harvest Supplies

- ❑ Specialty Crops can produce a lot of product (40,000 pounds per acre)
- ❑ Often harvested as immature perishable product
- ❑ Have to be ready before harvest starts



Washing, Packing Line

- ▣ Medium and Large Growers
- ▣ Producers for Wholesale Market
 - ▣ Standardized boxes for specific crops



Coolbot Cooler System

- ❑ Insulated area, trailer
- ❑ Window air conditioner
- ❑ Coolbot system



Washing and Cooling for Small Acreage Growers

- ▣ Washer



- ▣ Hydrocooling and washing system



High Tunnel Equipment



High Tunnel Equipment

- ▣ One or two person mulch layer with drip tape
- ▣ Specialized transplanter for plants grown in paper cells



High Tunnel Equipment

- ▣ Small human powered precision planters
- ▣ Broadfork
 - Great for planting onions on plastic



Salad Greens



- ▣ Harvester (likely 10 times as fast as hand harvest)

- ▣ Salad greens spinner to clean greens



- ▣ Innovative systems

Equipment and Budgeting

- ▣ Commodity vs Specialty Crops (twin brothers)
- ▣ Fixed Costs vs. Variable Costs
- ▣ Depreciation (accelerated depreciation, section 179)
- ▣ Technically, small items can be classified as annual costs under supplies
- ▣ Equipment vs. Labor Costs

Suppliers

- ▣ Morgan County Seeds
- ▣ Johnny's Seeds
- ▣ Roeters Farm Equipment, Michigan
- ▣ Orschlein, Tractor Supply
- ▣ Farm Auctions

QUESTIONS

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