

Benefits of TRIOS™ BioCrop Run Deep in Tomatoes

San Joaquin Valley tomato growers are realizing the benefits of cover crops to improve soil tilth, reduce inputs and ultimately improve plant health and yields.

UCCE Farm Advisor Jeff Mitchell, an early researcher of conservation tillage systems in California, has been studying conservation tillage operations and the use of rotational cover crops in annual cropping cycles for 15 years in the Valley. He said that interest and innovation in the systems among Westside processing tomato growers are now increasing at a rapid pace.

"I would estimate 6,000 to 10,000 acres of processing tomatoes are in cover crops on the Westside, which is a considerable increase to five years ago," Mitchell said.

Mitchell has studied a number of winter forages as cover crops in tomatoes and said triticale has been a proven performer for SJV conditions.

"Through our studies very early on we identified that triticale grows very well in San Joaquin Valley systems," he said. "Year in and year out it tends to be a leader in terms of winter forage materials and it did very well in our studies at Five Points on the Westside."

Gilroy-based Resource Seeds Inc. for several years has been developing and testing specific varieties that further the benefits of triticale as an annual cover crop in both permanent and row crops for California. Research agronomist Gene Aksland said the company's TRIOS™ BioCrop triticale varieties are selected specifically for California cover cropping conditions with early, late and standard maturities that suit a grower's specific planting and harvesting needs.

TRIOS™ BioCrop produces an expansive root system with short top growth to give growers maximum soil improvement with fewer management headaches from above-ground residue.

Root tube studies comparing TRIOS™ BioCrop to traditional cover crops such as wheat, rye and barley, show that TRIOS™ BioCrop directs 75 percent of its biomass into root development during the fall and winter, compared to 25 percent for conventional annual cover crops. That means more root mass to penetrate soil layers and create channels for air and water. The soil structure is held open by the mass of decaying root material after the cover crop is terminated to improve soil tilth and reduce compaction.

"Resource Seeds has been investing and developing lines with shorter stature and high root biomass so growers get a shift in root-to-shoot ratios. Growers can integrate them into tomato cropping systems to get the organic matter in the soil without having to deal with as much above ground biomass that frequently is a management problem at harvest," Mitchell said.

Daniel Burns of San Juan Ranching Co. in Dos Palos first started growing cover crops in processing tomatoes about a decade ago to improve field access in blocks that tend to saturate over the winter. The crop draws moisture out of the beds so Burns can get in sooner to list beds for transplanting. When San Juan Ranching put the first of 500 acres of tomatoes under buried drip three years ago, Burns also adopted a rotational cover crop system to help manage soil pests and weeds in back-to-back tomatoes on permanent 60-inch beds.

Last year San Juan Ranching turned to TRIOS™ BioCrop on much of that drip tomato acreage as an alternative to wheat to reduce the amount of crop residue above ground while enhancing the soil building benefits.

San Juan Ranching drills TRIOS™ BioCrop at a rate of about 80 pounds seed per acre into pre-irrigated beds in the fall, typically by about mid-November, and gives it enough irrigation to help the seed germinate, depending on the weather. The BioCrop is terminated with glyphosate in mid-March when it is about a foot or two tall. A couple weeks later the residue is lightly incorporated into the top few inches of soil with an implement that then reshapes the 60-inch bed in a single pass. Tomato transplants are then planted in April for a September harvest.

'With TRIOS we get more benefits than wheat in soil tilth with the deep root and it is only a foot tall when we kill it so there is a lot less trash to manage on top.' — Daniel Burns, San Juan Ranching Co.

Burns expects to have about half his 3,000 acres of processing tomatoes on drip within three years and said that, with last year's positive results, he expects to increase his TRIOS™ BioCrop acreage as well.

"I could see growing TRIOS on about half of our drip tomato acreage depending on other crops we have in rotation," Burns said. "With TRIOS we get more benefits than wheat in soil tilth with the deep root and it is only a foot tall when we kill it so there is a lot less trash to manage on top."

Scott Schmidt with Farming D in Five Points also planted TRIOS™ BioCrop for the first time last year after cover cropping in the past with a barley and vetch mix.

Schmidt said having a cover crop like TRIOS™ helps improve soil tilth and texture, increase organic matter content and break up compaction.

"That's really what we're after is to promote the health of the soil and get good microbial activity," Schmidt said.

Schmidt comes in behind harvest on his drip irrigated tomatoes and reshapes beds. He plants TRIOS™ BioCrop with a grain drill around October and sprinkles up the cover crop if there is no moisture in the bed. When it gets moderate in size, Schmidt terminates the crop with glyphosate or other means and then tills it under about 4 to 6 inches deep, just deep enough, he says, to get "a nice tilthy bed to plant our transplants."

Aksland said growers should select the TRIOS™ BioCrop variety according to when the cover crop will be terminated to accommodate tomato planting dates. Selecting the right maturity variety for timely crop termination will provide maximum root growth benefits with minimum surface crop residue.

For standard tomato planting use TRIOS™ 102 or TRIOS™ 348, interchangeable standard maturity triticale with an early April termination date. For early tomato plantings, Aksland recommends TRIOS™ 336, an early maturity triticale with a mid-March termination date. And for late tomato plantings plant TRIOS™ 888, a late-maturing triticale with a mid-April termination.



The powerful root system of TRIOS™ BioCrop penetrates soil layers with roots that provide channels for air and water to improve soil structure and reduce compaction.

Aksland recommends planting TRIOS™ BioCrop into soils that still have some summer warmth to get maximum root development and either plant into pre-irrigated beds or apply one or two irrigations after seeding for optimum germination.

According to Aksland, over time each individual grower is likely to refine her or his selection and management of TRIOS™ varieties to meet their specific needs, and seed dealers can help growers make some of those decisions. Mitchell said innovations in equipment and varieties, and new strategies to manage cover crops, are already helping growers develop the individual system that works best for them.

"These really are systems," Mitchell noted. "It's not just interjecting a single technology or sort of remedy into their field, so growers need to develop an individualized management plan for planting and establishing and terminating the cover crop, and managing it for their tomato planting operations."



Westside San Joaquin Valley tomato grower Daniel Burns of San Juan Ranching Co. said TRIOS™ BioCrop is improving soil tilth as a cover crop in drip irrigated tomato fields.

MANAGING TRIOS™ BIOCROP FOR MAXIMUM BENEFIT IN TOMATOES

- 1) Select the TRIOS™ variety with the maturity that best accommodates tomato planting schedules
- 2) Plant from late September to mid-November into warm soils for optimum root growth
- 3) Plant into moisture or apply one to two irrigations to help germination.
- 4) Plant at rates of 60 to 80 pounds seed per acre
- 5) Consider 30 to 40 pounds N per acre to stimulate early root growth.
- 6) Chemically kill TRIOS™ cover crop before it enters reproductive stage to minimize top growth.
- 7) Leave residue on the surface or disk it under according to individual system.



Root tube studies show that TRIOS™ BioCrop improves soil tilth by directing significantly more of its biomass during the winter to root development than standard annual cover crops. Three-fourths of TRIOS™ BioCrop plant growth occurs below ground, compared to an average of 25 percent for typical barley, wheat and rye cover crops.

Cover crop	Root Wt. (grams)	Top Wt. (grams)	Root-to-Top Ratio
TRIOS™ BioCrop	34.9	45.5	0.76
Merced Rye	10.6	50.0	0.21
UC 603 Barley	12.7	39.2	0.33

For More Information on
TRIOS™ BioCrop Contact:
M.C. Gomes
Resource Seeds Inc.
(209) 484-0617
mcgomes@resourceeds.com
www.resourceeds.com