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## California

# Nitrogen deficiency stifles organic strawberry yields

By **TIM HEARDEN**  
Capital Press

SANTA CRUZ, Calif. — With fumigants on their way out, organics could be the future of strawberry production in California, but persistent troubles with plant yields may be holding it back.

Organic production amounted to 3,400 acres of strawberries this year, or about 9 percent of the 38,100 total acres of strawberries in the Golden State in 2015, said Mark Gaskell, a University of California Cooperative Extension farm adviser.

Organic acreage has increased rapidly each year since 2000, but growers have never been able to match the yields of neighboring conventional farmers, Gaskell said.

“Really, organic strawberry production has continued to increase for the past 25 years in California,” he said during a webinar on Dec. 16. “There are growers and farming operations that have been growing organic strawberries for 25 years or more. There are growers with considerable experience in growing organic strawberries, but yields are 40 to 60 percent of regular strawberry production.”

Organic growers encounter two main challenges — soil-borne diseases, for which fumigants such as methyl bromide are used on conventional berries, and nutrient deficiency.

With methyl bromide expected to be totally phased out by the strawberry industry by next year and with other fumigants such as chloropicrin and Telone facing increasing scrutiny, the California



Tim Hearden/Capital Press

Organic strawberries from Santa Maria, Calif., are displayed at a farmers' market in Davis, Calif., in late 2014. Because of soil-borne diseases and nutrient loss, growers of organic strawberries are having a hard time achieving the yields that conventional growers achieve.

Strawberry Commission has spent millions of dollars in recent years researching alternatives such as crop rotation, using natural sources of carbon to eliminate soil pathogens and sterilizing soil with steam.

Among the concepts that UC and other scientists have been testing to control berry-busting bugs and diseases are raised-bed troughs and “soiless” fields, according to a more than 200-page summary of projects the commission published last year.

But while much attention has been paid to finding natural ways to combat soil-borne diseases that can wreck plants, often the primary factor limiting plant growth is a lack of nitrogen available to the organic plants when they need it most, Gaskell said.

“Our challenge is we have this extended harvest season” and much of the plants' demand for nitrogen occurs later in the season, meaning

pre-plant cover crops or compost alone might be inadequate to fulfill the plants' demand, he said.

While conventional growers can turn to controlled-release nitrogen fertilizers to bolster productivity as the season wears on, no such timed-release fertilizers are available to organic growers, researchers say.

Under the current system, mid-season fertigation and foliar nitrogen applications are the only practical means for supplementing nitrogen levels, but those methods' effectiveness can vary because of a variety of factors, ranging from soil type to weather. Liquid organic fertilizers can supply sufficient nitrogen in the late stage, but they have a high risk of nitrogen leaching if big rains come.

Gaskell and Joji Muramoto, a researcher in the UC-Santa Cruz Department of Environmental Studies, have been conducting field

trials along the Central Coast in recent years to test different cover crops, soil treatments and in-season fertigation levels to find one or two methods that work the best.

Among methods used to prepare fields before planting, the researchers found that composts and a sudan grass cover crop had no appreciable effects on yield, and the use of blood meal — a high-nitrogen powder fertilizer made from blood — was only effective in dry and warm winters, they said. In-season nitrogen injections had no effect in three out of four seasons, partly because of low distribution efficiency, the researchers said.

However, based on analysis of six field trials with 53 different treatment combinations, the scientists did find that nitrogen loss is strongly dependent on the amount of residual soil nitrate from the previous crop, the amount of nitrogen added in crop residue just before planting and the amount of pre-plant organic fertilizer used, they said.

More studies are needed to understand how to improve fertigation efficiency, reduce nitrogen loss during rainy winters and recognize the interaction between plant root health and nitrogen demand, the researchers said.

Meanwhile, most organic strawberry operations in California remain small, averaging 20 to 25 acres, Gaskell said. And growers who produce both organic and conventional strawberries notice a difference.

“Growers observe that the (organic) plants are always smaller ... and yields are consistently lower relative to their conventionally grown varieties,” Gaskell said.

## Almond Board seeking candidates

By **TIM HEARDEN**  
Capital Press

MODESTO, Calif. — A panel is seeking four California almond growers and two handlers to help shape the future of the Golden State's No. 1 tree crop.

The Almond Board of California is seeking two independent grower members and two grower alternates as well as an independent handler and a handler alternate to fill posts on its board of directors.

Each grower candidate must submit a petition signed by at least 15 other almond growers, and handlers need only declare their candidacy in writing to be placed on the ballot. The deadline for applying is Jan. 20.

The 10 board members serve terms of one or three years, and they include independent growers and handlers as well as representatives of cooperatives. Among the independent members, growers will vote for grower members and handlers will vote for handler members, said Sue Olson, the almond board's associate director of marketing order services.

Ballots will be mailed to California's 6,000 almond growers and more than 100 handlers on Jan. 29 and are due back Feb. 11. Terms will begin March 1.

Almonds were second only to milk among California's top commodities in 2014, valued at \$5.9 billion, according to the state Department of Food and Agriculture. The Almond Board of California administers the federal marketing order for almonds, providing production research, generic advertising and industry statistics.

The federal marketing order for almonds was established in 1950 as the Almond Control Board, dealing mainly with compliance issues. The panel changed its name to the Almond Board of California in the 1970s to reflect a greater emphasis on market development and research.

The board recently launched an initiative called Accelerated Innovation Management, a pledge to devote more resources to research and training in sustainable farming practices. In June, the board announced it was committing an additional \$2.1 million toward independent research into next-generation farming practices.

Declarations of candidacy and petitions must be sent to the Almond Board of California, 1150 Ninth St., Suite 1500, Modesto, CA 95354. For information, call Olson at (209) 343-3224.



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## TEEN LEARNS BIG LIFE LESSONS FROM SMALL HORSE

BROWNSVILLE, Ore. — Angel McIntyre was a horse lover by the age of three. At the age of 13, she knew she wanted to be a therapeutic riding instructor. Today at the age of 18, Angel's passion for equines is stronger than ever.

Eight years ago, Angel rescued a petite silver strawberry roan miniature horse named Chief.

“He was a wild child,” says Angel, as she describes the start of her journey to gentle the skittish equine, build trust, and train him to drive a cart.

Angel and her mother, Mary McIntyre, called on the expertise of horse trainer Kristie Fosback, who conducted the initial training with Chief. Once the three-year-old colt had settled down, Angel assumed the challenge as Chief's trainer and joined the Rhinestone Riders 4-H Club.

According to Robin Galloway, OSU Extension 4-H faculty, “Angel has learned valuable life skills like patience and systematic thinking through her 4-H horse project with Chief. It's been wonderful to have the McIntyres increase awareness of driving equines in our local program.”

Chief is an American Miniature Horse, a unique breed quite different from ponies. They are an elegant, scaled-down version of the large horse that cannot be taller than 38 inches at the last hairs of the mane.

“While they can carry up to 90 pounds on their back, many minis are trained to drive. They can pull up to twice their weight or around 500 pounds,” explains Angel. The pair has participated in county and state fair, dressage, driving trials and even a 5K event that had to be completed within 30 minutes.

Mary McIntyre has been a 4-H volunteer for many years and is known as the 4-H driving mentor in Linn County. “I have enjoyed watching Angel and other kids grow in the 4-H Program,” says Mary. “4-H has helped mold Angel into the person she is today.”

As part of her 4-H experience Angel has learned to set goals and embrace what she needs to do in order to achieve those goals. “She has learned how to read people and how to adjust her approach accordingly,” says Mary.



Angel McIntyre with her silver strawberry roan miniature horse named Chief.

“I have learned the merits of good record keeping in 4-H — including financial records, animal health records and I have created a resume,” Angel explains.

Any equine may be trained to drive. Horses, minis, ponies, mules and donkeys will all pull carts.

People take up horse driving for many reasons: To continue to use a small horse that has been outgrown; because people enjoy the small equine breeds as companions; as an enjoyable leisure activity; as a competitive sport; for handicapped people who are not able to ride horses; and for aging equestrians who want to stay active.

To start driving, Angel recommends these steps:

- Find a local driving club or 4-H volunteer who can serve as a mentor.
- Buy the horse or pony (don't buy the cart before the horse!)
- Buy the cart and harness.
- Work with your mentor to adjust the fit of the cart and harness to your horse.

“It's a fun thing to do — I recommend it!,” says Angel with a smile from the seat of the two-wheeled cart as Chief trots off down the road to take a turn or two around the neighbor's field.



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