

Vetch Mulch Fetches More Veggies

It's become a tomato-growing truism: Plastic films improve yields. Black polyethylene mulch not only retains soil moisture and fights weeds; it also warms the soil and often advances crop maturity. No surprise that, over the past 40 years, plastic mulch has crept into nearly universal use among those who grow tomatoes for the fresh market.

But, manufactured as it is from petrochemicals, plastic film is not without its shortcomings. Films cost as much as \$630 an acre including laying, removal, and disposal. And once harvest is over, that plastic-paved plantation becomes a landfill-clogging disposal problem.

Several years ago, two ARS scientists went looking for an organic mulching system to replace plastic sheeting—and touched off a tomato revolution. Their unique grow-your-own organic mulch system continues to win converts, rewarding many who try it with more fruit of a higher quality for considerably less work.

For the fourth consecutive year of field trials, plant physiologists Aref A. Abdul-Baki and John R. Teasdale have found their method increases tomato yield, extends the market season, and cuts production costs.

According to a marketing report released by ARS economists Terry C. Kelly and Yao-Chi Lu, the vetch mulch system returned to growers an average 65 percent increase in profit, compared with growing tomatoes in plastic mulch. You can enjoy those production benefits, too, whether you're a large-scale producer or a backyard tomato fancier.

Abdul-Baki and Teasdale are also accumulating evidence that their cropping system can feed the soil for other row crops: cantaloupe, snap beans, peppers, eggplant, even sweet corn.

The key to its success? A soil-improving, nitrogen-imparting, weed-suppressing, self-composting legume called hairy vetch.

KEITH WELLER



Plant physiologist Aref Abdul-Baki checks vetch mulch thickness. A dense layer of mulch lowers summertime soil temperature and reduces water loss. (K5870-1)

Grow Tomatoes Like Never Before

The first step toward high tomato yields is taken in early September when you plow and disk the field, then prepare permanent raised tomato beds. If you're trying this method for the first time, use a vetch inoculum to establish the proper soil bacteria.

Seed the beds with hairy vetch, a winter-hardy annual legume that's becoming widely available, about 2 months before winter freezeup. Seedlings will emerge within 1 week and by the time the first frost arrives, plants will be 5 to 6 inches tall.

Above ground, they'll form a mat; underground, the roots systems will grow into an extensive network.

Foliage and root systems will work together, both above and below ground, holding the soil firmly to stop erosion.

Below-freezing weather will cause the vetch vines to become dormant, but never fear; spring reinvigorates growth. By May, individual vines will be 4 or 5 feet long and form thick stands about 2 feet high.

Determine your ideal local tomato-planting time. The day before, mow the vetch with a high-speed flail mower and leave the residue in place on the beds. Tomorrow you'll transplant young tomato plants right through the mulch residue and into the underlying soil. The killed vetch will form an organic mulch blanket around each plant. As it decays, the mulch will feed nitrogen and other nutrients into the soil.

Moisture is vital to the establishment of transplanted tomatoes, so you'll need to irrigate. Immediately after planting, install trickle irrigation lines on top of the vetch and 3 to 4 inches from the tomato row. Fix them in place with U-shaped wires.

As for fertilizers, a good stand of vetch provides sufficient nitrogen to meet from half to all that needed by tomatoes. Follow fertilizer recommendations based on soil tests to ensure adequate phosphorus, potassium, and essential micronutrients.

Stake and tie up the plants 2 to 3 weeks after planting and continue as they grow bigger.

During the first month after mowing, expect the vetch mulch to suppress weed emergence. After that, as the decomposition of the residue advances, weed seedlings are likely to emerge. One herbicidal application of 0.5 pound active ingredient of metribuzin per acre should do the trick, applied 3 to 4 weeks after transplanting. This application will also kill any regrowth from the mowed vetch plants.

AREF ABDUL-BAKI



Hairy vetch produces 3,000 to 5,000 pounds of dry matter per acre and from half to all the nitrogen needed to support tomato production, says plant physiologist John Teasdale.

By summer's end, the tomato plants will bear an abundance of fruit, the organic mulch will decompose to a fare-thee-well, and the year will have come full circle. Mow the old tomato plants and leave them in the field to decompose like the vetch mulch. Now it's time to reseed with hairy vetch!

Processing Tomatoes: Can Vetch Help?

Production of fruit destined to become ingredients in processed foods such as catsup and frozen pizza has dwindled on the East Coast—enough in recent years to cause processing plants to close.

Results compiled by Abdul-Baki, Teasdale, and plant geneticist John R. Stommel from the past 2 years' tests suggest that vetch culture methods could help resuscitate this ailing segment of the tomato market.

Unlike fresh-market tomatoes, processing tomatoes are grown in bare soil. Mulching with plastic films is out of the question—not only do the sheets get caught in the teeth of harvesting equipment, but the plastic mulches raise production costs significantly without increasing yield.

So in addition to the benefits that are unique to hairy vetch, processing tomato producers stand to reap even more dramatic yields from the organic mulch system. According to 2 years of data, yields ranged from 16 to 42 percent higher in the 10 varieties tested. This reflects the advantages of mulching in general, a practice that boosts plant growth by improving soil fertility.

And since organic mulch crowds out the weeds that spring up with abandon in bare soil, processing tomato growers may reduce their dependency on chemical herbicides. —By **Jeanne Wiggen**, ARS.

Aref A. Abdul-Baki and John R. Stommel are at the USDA-ARS Vegetable Laboratory, Bldg. 004, 10300 Baltimore Ave., Beltsville MD 20705-2350; phone (301) 504-5057, fax (301) 504-5555.

John R. Teasdale is at the USDA-ARS Weed Science Laboratory, Bldg. 264, 10300 Baltimore Ave., Beltsville MD 20705-2350; phone (301) 504-5504, fax (301) 504-6491. ♦

Free How-To Bulletin

For a detailed set of instructions, request your free copy of Farmers' Bulletin 2279, *Sustainable Production of Fresh-Market Tomatoes With Organic Mulches*, from Aref Abdul-Baki, USDA-ARS Vegetable Laboratory, Room 210, Bldg. 004, 10300 Baltimore Ave., Beltsville MD 20705-2350.