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The IPM Scout

USING COVER CROPS TO DEVELOP A SUSTAINABLE COMMERCIAL PUMPKIN PRODUCTION SYSTEM

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Auburn University*

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Across the United States, there is an increasing desire for production agriculture to become more sustainable. Previous studies examining conservation tillage using residues from a cover crop grown before pumpkins have been inconclusive. Researchers have reported, however, that reduced tillage is more promising than no-till as a strategy for vegetable production. Strip-tillage (ST) is a method in which a portion of the soil surface is tilled and subsoiled, usually the in-row portion, and the row middles are maintained undisturbed with residues. This provides a loose friable bed capable of accepting transplants or seeds. Seedbeds prepared by strip-tillage can be planted without the need for specialized equipment, i.e., transplanting equipment used in conventional production can be used instead of a no-till planter.

Commercial pumpkin production in Alabama has grown from under 200 acres in 1994 to over 1,200 acres in 1999. Much of this growth has been due to small and part-time growers looking for alternative crops with which they can diversify their operations.

The most limiting factors for pumpkin producers in Alabama are moisture availability and weed control. Droughts are common in summers in Alabama. Pumpkins that develop under moisture stress can be misshapen, off-color, and undersized. Currently, there are few herbicides available that provide season long weed control. Many growers rely on hand-pulling to maintain season long weed control. This is often too costly or labor-intensive for many growers. Cover crops help suppress early-season weed growth. A production system that uses cover crop residues for moisture conservation and weed suppression would be very valuable.

A 3-year study was begun in 1999 on side-by-side comparisons of growth and development of pumpkin as affected by different cover crops, tillage systems, and rates of nitrogen (N). Three cover crop systems are being evaluated in Cullman, AL.: yucchi arrowleaf clover, hairy vetch, and wheat combined with crimson clover. Within each of these cover crops, three N rates (0, 45, and 90 lb./acre) are included. Each cover crop was allowed to die back naturally and then was mowed down before plots were strip tilled.

We are going in to the second year of this study. Last year, there was no difference among N rates between the treatments. There were differences, however, between cover crops. Marketable yields (lb./acre) were as follows:

- 25,726 hairy vetch
- 21,974 yuchi arrowleaf clover
- 20,227 wheat/crimson clover
- 16,136 bare ground

Initially, it seems that there is a positive benefit to using mulch. Vetch plots yielded significantly more than all of the other covers. Bare-ground plots produced the lowest yield compared to any of the other treatments. This work will continue and more information will be available in winter, 2000.

TWO POWDERY MILDEW RESISTANT PUMPKINS

Dr. Anthony P. Keinath, Vegetable Pathologist
Clemson University

A small trial (two replications only) was conducted in Charleston, SC, in 1999 to compare two powdery mildew-resistant cultivars to the most closely related susceptible cultivars. The two resistant/susceptible pairs were ‘Touch of Autumn,’ a powdery-mildew resistant ‘Peek-a-Boo,’ and ‘RWS 6260,’ which is a resistant cultivar from Novartis (Rogers Brand) Seeds similar to ‘Hybrid Pam.’

Variety	Powdery mildew reaction	Powdery mildew, top of leaf (%)	Powdery mildew, leaf underside (%)	Downy mildew (%)
Touch of Autumn	R	0.5*	1	23*
Peek-a-Boo	S	5.5	31	49
RWS 6260	R	0.75*	0.75	17
Hybrid Pam	S	3.3	24	29

* means that the R cultivar was less diseased than the corresponding S cultivar, 95% probability level.

The two powdery mildew resistant cultivars had much lower levels of powdery mildew than the susceptible cultivars. Interestingly, ‘Touch of Autumn’ also had somewhat less downy mildew than ‘Peek-a-Boo.’ Yields of the cultivars did not differ statistically, although as reported in **SC Pumpkin News** Jan. 2000, ‘Hybrid Pam’ had the highest yields and the longest handles. Charleston received 6 inches of rain in one week between the first and second harvests, which partially explains the large number of cull fruit.

Variety	Mkt. No.*	Cull No.*	Handle (in.)
Touch of Autumn	6.0	20	2.5
Peek-a-Boo	5.5	26	3.2
RWS 6260	3.5	21	2.9
Hybrid Pam	11.5	28	3.9

* number of fruit per 32-ft plot with 8 plants.

PUMPKIN ROOTS: WHAT YOU DON'T KNOW CAN HURT YOU!

Dr. Robert J. Dufault, Vegetable Horticulturist
Clemson University

Unknown to most growers, root systems of pumpkins are as large and extensive as the foliage. With trees, in general, what you see in growth above the soil is matched by root growth in the ground. The same situation exists with pumpkins. In a “one-of-a-kind” research project in 1927, John Weaver and William Bruner, botanists at the University of Nebraska, grew many different vegetable crops and, over time, excavated and mapped the course of the root systems. They published their work in a book titled *Root Development of Vegetable Crops*, published by McGraw-Hill Company, New York. To my knowledge, no one since has attempted such a difficult task.

Vines of ‘Small Sugar’ pumpkin were about 16 feet long at maturity and the top 12 inches of soil were filled with roots. The taproot of mature pumpkins grew 6 feet deep and had 10 or more lateral branches that extensively branched outward for 5 to 17 feet or more. Many of these lateral roots were 2 to 4 feet long and all complexly and minutely re-branched, forming a “wonderfully efficient root complex.” The second and third feet of soil were also thoroughly filled with roots, with the fourth foot of soil containing many vertically descending roots. Plant size of pie pumpkins, like ‘Small Sugar’, may not be as large and vigorous as the jack-o-lantern types. It is probable that the root systems of larger pumpkins may be more extensive than those reported in this book.

So what does this mean to the pumpkin grower? Both cultivation and fertility practices must consider the developing root system hidden beneath the surface. Generally, pumpkin roots grow faster than foliage and root extension outward usually is equal to or greater than the vine spread. If cultivation is necessary, it should be done before the vines run over the ground to be cultivated. Cultivation must only graze the soil surface to avoid root damage. Later cultivation should be avoided entirely and a good herbicide program used for weed control.

Pumpkin vines root in the areas between the planted rows and provide "shortcuts" for water and nutrients to enter the plant. Therefore, pumpkin vines shouldn't be moved around unnecessarily. Broadcasting fertilizer within the space between planted rows may provide nutrition to support the rampant growth of pumpkins and help pumpkin fruits developing on satellite vines usually quite distant from the main plant.

Cultivar Corner

Novartis Seeds, Inc.-Rogers Brand has sold all of its pumpkin cultivars to Seeds by Design Inc., located in Willows, California. Seeds by Design specializes in tomato, watermelon, pumpkin, and winter squash. Their seed is available through seed dealers. Headquarters is at 130 N. Butte St., Willows, CA 95988; phone 530-934-8086.

The great rush to bring new pumpkin cultivars to market seems to have slowed a bit. We are not aware of any new cultivars that have not been featured in **SC Pumpkin News** previously.



Ask the Great Pumpkin

Q: Do you have particular Howden-type varieties that perform well for you in South Carolina? I've tried several but they only produce about a third as many fruit as the Mammoth Gold. Is the Howden type dependent on a cooler temperature and a clayey type soil?

GP: I agree that the Howden-type pumpkins seem more sensitive to heat than the Mammoth Gold-types. Here in Charleston, on white-on-black plastic, Magic Lantern was one of the best-yielding, Howden-type and -size pumpkins. Yields under hot and humid conditions, though, are lower than yields farther north. Heat stress will worsen with any type of moisture stress, such as flagging leaves on hot

summer afternoons, even for a brief period.

For information on pollination and fertility as they relate to fruit set, see **SC Pumpkin News** April and July 1999. Basically, make sure you have enough bees to pollinate as many flowers as possible and side-dress to make sure the developing fruit have a steady supply of nitrogen. This seems especially important on the sandy soil you said you have. You might consider trying drip irrigation and plastic on a small portion of your acreage to see if they increase yields enough to make the expense worthwhile.

Next issue (July 2000): Forecasting downy mildew.

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