

Pumpkin Grown with Leaf Mulch Produces Large Attractive Fruit and Builds Soil Quality

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The increasing demand for pumpkin grown for wholesale, fresh market, or ornamental use creates a need to design sustainable production practices for this crop. A key to profitable U-pick pumpkin operations is maintaining attractive fields which are weed-free and in conditions suitable for consumers to enter. Autumn leaves collected from shade trees are a resource available from urban landscapes that are useful for mulching the soil surface and providing weed control in pumpkin fields. This practice can contribute to sustainable production by conserving soil moisture, preventing soil erosion, and building soil fertility. A concern with the use of leaf mulch is the relatively high C/N ratio that can cause tie up of soil N (immobilization) and lead to crop N deficiency.

A study was conducted to determine the effects of leaf mulch and two rates of N application on pumpkin production. Plots were established to compare bare soil plots with herbicide for weed control to a 6 inch layer of leaf mulch without herbicide. Prior to planting and mulch application, 50 N lbs/acre was broadcast over all plots. Pumpkin was hand seeded in Mid-June each year. In July, N was sidedressed at 25 lbs/acre to all plots and in early August an additional 50 N lbs/acre was sidedressed to half of the plots.

Chlorophyll meter readings measured in early July confirmed that crop leaf greenness was reduced on mulch plots due to soil N immobilization. The N deficiency induced by leaf mulch was only temporary as the crop quickly recovered following N sidedressing.

In 2005, total number of orange marketable fruit was higher in bare soil plots compared to mulch but in terms of weight there was no difference in yield of orange fruit because the mulch plots produced a larger and heavier fruit. In 2006, number of orange fruits was not different among treatments and there were less than half as many green fruits on mulch plots as compared to bare soil plots. Also in 2006, fruit size and yield of orange marketable fruit was greater from mulch plots compared to bare soil plots. The rate of N fertilizer did not influence yield in either growing season. An application rate of N greater than what is normally recommended for pumpkin is unnecessary when using leaf mulch, but sidedress N should be timed to overcome the expected early season N deficiency.

One outstanding advantage of mulching with leaves that was observed in both growing seasons was a much cleaner fruit (92% clean on mulch compared to 25% on bare soil). In most cases a thin mulch layer persisted all the way to harvest and was an effective barrier to prevent contact of the undersides of pumpkin fruit with soil.

In both years, the mulch was at least as effective at preventing the growth of annual weeds as the herbicide that was used on the bare soil plots. The only place where weeds invaded the mulch plots were in the vicinity of the rows where leaf mulch was moved aside to place pumpkin seed in the soil. Although we did not remove these weeds during the course of this experiment, farmers desiring a weed free field may choose to hand weed these relatively small areas.

In summary, mulching with shade tree leaves is a practical alternative to using herbicide for weed control on pumpkin and it has several additional advantages. The mulch produces a cleaner fruit and a barrier to mud clinging to shoes in U-pick operations where this may enhance public enjoyment of the “agri-tainment” experience. Fruit size and yield tend to improve with mulch. There is no need to apply more nitrogen to grow pumpkin with leaf mulch compared to bare soil production systems, but be advised to apply sidedress N fertilizer early to overcome an expected, but temporary, crop N deficiency.

Leaf mulch is an effective way to prevent soil erosion and it can build soil organic matter content. Another advantage with leaf mulch is that it can form a mat to serve as an effective barrier to germination and emergence of annual weeds. Perennial weeds, such as Canada thistle, however, can emerge through a thick layer of leaf mulch. Leaf mulch residue that persists until pumpkin harvest may provide a natural barrier to prevent fruit contact with soil, providing cleaner fruit. Unlike herbicides used in conventional pumpkin fields to control weeds, leaf mulch reduces pesticide use and helps to build soil quality. Research is underway to study the residual effects of mulch in the following year with sweet corn as a test crop.

Table 1 Effect of bare soil with herbicide versus leaf mulch and sidedress N rate on pumpkin fruit size and yield in 2005 and 2006. Means followed by the same letter within a column are not different.

Treatment	Broadcast before			Sidedress Rate and Time		Fruit size	Yield	Fruit size	Yield
	June seeding	N lbs/acre		lbs/fruit	tons/A	lbs/fruit	tons/A		
		July	August	2005		2006			
Herbicide	50	25	0	9.1 b	15.3 a	8.1 c	13.6 b		
Herbicide	50	25	50	8.8 b	15.7 a	7.8 c	13.4 b		
Mulch	50	25	0	12.3 a	16.7 a	11.0 b	21.1 a		
Mulch	50	25	50	12.2 a	15.3 a	13.4 a	22.2 a		

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