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Consider Plant Maturity to Schedule Vine Kill Date

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Several years ago almost all potatoes planted in Idaho were the variety Russet Burbank, but now several other varieties are also produced. Producers need to know when to kill the vines to obtain maximum yield while at the same time completing harvest in a timely manner.

To obtain updated information on the bulking rate of Russet Burbank and learn about bulking rates of some of the newer varieties, a two-year rate study was conducted at the Aberdeen R & E Center. Russet Burbank, Russet Norkotah, Russet Norkotah CO#3, Ranger Russet, Alturas, and Shepody were planted April 28, 2003 and May 1, 2004. Samples were harvested at two-week intervals beginning July 1, 2003 and July 3, 2004 and yield and bulking rate were computed.

For all varieties, yields were higher in 2004 than 2003 (Figure 1). This can be partially explained by growing-season differences. From planting through the last harvest in 2003, data from the Agrimet (<http://www.usbr.gov/pn/agrimet/yearrpt.html>) weather station at the Aberdeen R & E Center indicated there were 35 days with 90-plus degree temperatures, but only ten such days in 2004. Additionally, during July and August, 2003, there were ten consecutive days of over 90-degree temperatures followed by two additional six and seven-day periods. In 2004, the longest stretch of consecutive days with temperatures above 90°F was one three-day period in mid-August.

Before discussing the data further, you may be wondering about the 2007 crop year. From the same Agrimet information source, June had three days with temperatures above 90°F and six days with 85 to 90°F. July turned out to be a hot month with 16 days of 90-plus degrees and 12 days in the 85 to 90-

degree range. What effect does temperature have?

It's commonly said that potato plants "shut down" when daytime temperatures exceed about 90°F—not entirely true. Even on hot days there is a substantial period of time in the morning when the rate of photosynthesis is quite high. However, in the afternoon, the photosynthesis rate does drop dramatically when leaf temperature exceeds 85°F. This likely happened more often in 2003 than 2004 causing the yield differences in the data.

Table 1 shows the linear and maximum

Table 1. Maximum and Linear Bulking Rates of Six Potato Varieties Averaged Over 2003-2004.

Variety	Maximum cwt./a/d	Linear cwt./a/d	Linear Days
Russet Burbank	12.3	7.8	45
Russet Norkotah	12.5	8.1	33
Russet Norkotah-CO#3	8.1	5.0	75
Alturas	10.5	6.6	63
Ranger Russet	9.4	5.7	77
Shepody	10.8	6.9	51

bulking rates for the varieties in the study. Linear bulking rate was estimated by counting the days between the time a variety had accumulated 20 cwt./acre to when it had reached its maximum yield minus 20 cwt. Maximum bulking rate reflects the growth rate during mid-season when bulking is at its highest.

We estimated percent dead vines (stems) at each harvest. In general, vines died earlier in 2003 than in 2004. We also observed the bulking rate of all varieties began to decline fairly rapidly as vines declined (died). Even though the presence of some dead vines is a good indication that bulking rate is declining, green vines do not necessarily indicate potatoes are still bulking at a substantial rate. Case in point, on the last harvest in 2003, 100 percent of the Alturas vines

were dead, but only 10 percent were dead in 2004 (data not shown), yet Alturas bulking rate was leveling off in late September in both years (Figure 1).

Furthermore, on August 26, 2004, Russet Burbank plots were rated at having only 8 percent dead stems, yet the crop was within 20 cwt. per acre of its maximum yield shortly before August 26. The bulking rate was leveling off in late August in spite of having over 90 percent green vines.

Note in Table 2 that tuber bulking rate dropped dramatically for all varieties later in the season. Compare the cwt./acre gained July 31 to August 14 with August 28 and later. It appears that temperature and/or other environmental factors are at least partially responsible for bulking rates declining, and having green vines later in the year does not mean tubers are bulking as rapidly as earlier in the season.

The bulking rate study was conducted at the Aberdeen R&E Center, but was validated in 2004 and again in 2006 by sampling growers' fields in southeast Idaho. From the small-plot research and sampling growers' fields, it appears important to keep potato vines green and healthy during the linear bulking phase in early July through mid- to late August, but having green vines late in the season may not warrant continuing inputs of fertilizer and water in an effort to obtain additional yield. Moreover, delaying vine kill increases the risk of not having

Table 2. Yield Gain Over a Two-Week Increment for the Last Eight Weeks of the Growing Season in 2003-2004.

Variety	Bulking Period			
	7/31 8/14	8/14 8/28	8/28 9/11	9/11 9/25
	-----cwt./acre-----			
Russet Burbank	104	28	5	1
Russet Norkotah	18	2	0	0
Russet Norkotah-CO#3	103	62	27	10
Alturas	141	107	46	15
Ranger Russet	117	69	30	11
Shepody	116	43	11	2

potatoes harvested before a damaging freeze.

The small-plot research data and field observations presented here should not be interpreted to mean that end-of-season bulking is not important, but that most of the bulking occurs earlier in the season, and producers need to pay particular attention to the linear bulking period. In spite of best management efforts, seasonal environmental conditions will still have a substantial effect on the final yield.

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Did You Know?

If a potato variety bulked at a rate of 8 cwt./a/day, and this gain was evenly distributed over a 24-hour period, it would be gaining weight at a rate of 0.55 pounds/minute.

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Figure 1. Bulking Curves for Six Potato Varieties Grown at the Aberdeen R & E Center in 2003-2004.

