DE-MYSTIFYING STEM NUMBERS

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It seems like almost every year just after the potato crop emerges we start getting questions about stem number, tuber set, and their relationship to seed physiology. At first glance, this might seem like a rather academic discussion – after all the number of stems you have at this point isn't going to change. However, taking a closer look at some of the most frequently asked questions on this subject can shed some light on how management practices can be adjusted to better optimize tuber size distribution.

How does physiological age and seed size affect the number of stems?
Both seed piece size and physiological age influence the number of stems produced by each plant. Physiological age can be impacted by the seed growing season, storage temperature, and chronological age. Seed will age at warmer temperatures. Every eye on a seed piece has the potential to produce at least one stem. Consequently, the more eyes per seed piece, the more stems. In general, the larger the seed piece, the greater the potential for more eyes. Additionally, as seed ages, the number of stems produced by each eye increases. The key to producing a more uniform tuber size profile is getting a consistent number of stems among plants by reducing variability due to wide ranges in seed piece size or physiological age. The only way to know how variable stem numbers are in your crop is to select random areas in the field and record the number of stems per plant on a minimum of 10 plants per location. Divide by the number of plants (eg. 10) and you will get your average stem number per plant. We recommend that you do this at minimum for every cultivar and seed lot.

Is stem number really that predictive of final tuber set?
Dr. Rick Knowles and his group at Washington State University were some of the first people to describe the close relationship between stem and tuber number per plant for commonly grown cultivars such as Ranger Russet, Russet Burbank and Norkotah Russet. For example, tuber number per plant in Ranger Russet increased by approximately 1 tuber for each 1 increase in stem number in typical plants ranging from 2.4 to 5.2 stems per plant. In Idaho, we showed very similar increases in tuber number with increasing stem number for both Russet Burbank and Ranger Russet across three growing areas (Parma, Kimberly and Aberdeen).

Average tuber size showed the opposite relationship with stem number, i.e. tuber size declined with increasing stem number because the same weight per plant is spread over more tubers. Interestingly, the decline in average tuber size with increasing stem number was also consistent across the three Idaho locations (Figure 1 shows this relationship for Ranger Russet).

How can information on stem number be used to adjust management practices?
At this point in the season there isn't much that can be done to change stem number or tuber set. However, realize that fields with high stem numbers will tend to have slower

growth rates of individual tubers, and may take longer to reach the desired tuber size profile. Manage fields with high stem populations to maximize the number of days of bulking in terms of fertility, irrigation and disease control practices. Also consider pushing back vine kill to allow more time for tubers to size.

In contrast, fields with low stem counts will have fewer tubers per plant, resulting in rapid bulking that can lead to an increase in physiological disorders, such as brown center, hollow heart, sugar ends, if stressed. Manage these fields to provide uniform growth conditions. Also monitor these fields regularly at the end of the season to properly time vine kill to prevent production of too many over-sized tubers for the intended market.