Factors Influencing Malting Barley Winter Survival in 2014

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In 2014, approximately 50% of the winter malting barley suffered from partial or complete winterkill, *Figure 1*. Observations from Cornell Cooperative Extension agronomists across New York helped to ascribe the associations and causal factors listed below. When disease (primarily snow mold) was suspected, the presence or absence was confirmed in the Bergstrom lab. Barley is the weakest of the winter small grains other than oats and variability in winter survival was evident in subtle patterns within many fields.

**VARIETAL TOLERANCE:** Heritability of barley to winter hardiness, like yield and quality, is a complex trait so it requires at least 3 years to make an accurate assessment of varietal tolerance. However, some winter malting varieties such as Archer, California, KWS Ariane, KWS Liga, KWS Scala, and experimental 6Ab08-X03W012-5 showed initial promise in one year of data by surviving relatively well through this past harsh winter.

**POOR DRAINAGE:** “Barley does not like wet feet.” This was especially evident on heavier soils. In some cases winter malting barley survived only over the tile lines and died out in between, *Figure 2*. 

**LACK OF SNOW COVER DURING EXTREME COLD:** Many fields that were sheltered by tree lines had improved survival and areas that had persistent snow cover. This trend appeared to be more common on north-facing slopes of winter malting barley fields. The extreme drops in temperatures well below 0°F without snow cover in January & February as well as below freezing temperatures during the early spring green up were very hard on all small grains, especially winter malting barley. Additionally, high winds likely dried out the plants, further weakening the winter malting barley stands.

**TOO EARLY PLANTING DATES:** A number of farmers had tall (over 6 inches) malting barley heading into the winter. This resulted in the barley smothering itself and, in a number of cases, snow mold (*Microdochium nivale*) was confirmed in these fields. Winter malting barley should be planted between September 15th and October 1st.
to minimize the fall growth of the crop while still having enough growing season to establish a good root system for winter survival.

**Planting depth:** Especially for barley sown late, planting depths greater than 1 inch were associated with better winter survival. Conversely, if planted deeply *too late*, there may not be sufficient fall barley growth due to the extra time needed to emerge from depth. Generally, planting at 1-1.5 inch depth provides an opportunity to develop a better root system in fall. Deeper seeding can also help assure that there is adequate soil moisture for better establishment in dry fall soil conditions.

**Shallow soils:** Winter survival appeared worse for winter barley on coarser soils that contained more gravel or stones that prevented drills from achieving adequate seeding depth or where there may not have been enough soil for an extensive root system to form in fall.

**Implications for farmers:**
This past winter reiterated the importance of many factors influencing the potential of winter malting barley as a viable crop to support the emerging NY based-craft brewing and distilling industry. The occurrence of winterkill was considerably less in 2012 and 2013 due to milder conditions and/or greater snow cover across much of NY during those years. While research will continue to search for malting barley varieties that can consistently survive and thrive under our winter conditions, farmers should do everything they can to plant at the proper time, depth, and in better drained fields to increase the chances of winter survival. Additions of phosphorous fertilizer with the barley seed at planting, removing excess fall vegetative growth, and tiling of fields or wetter areas of fields will all improve the likelihood of winter survival. Furthermore, farmers should only plant a portion of their malting barley acres to winter varieties and plan to also plant spring malting barley varieties to manage the risk associated with the winter survival.