Nursery Cooperative MANAGEMENT ALERT 2019 - 03

Widespread Seedling Survival Issues Observed Throughout Southern US:

March - June 2019

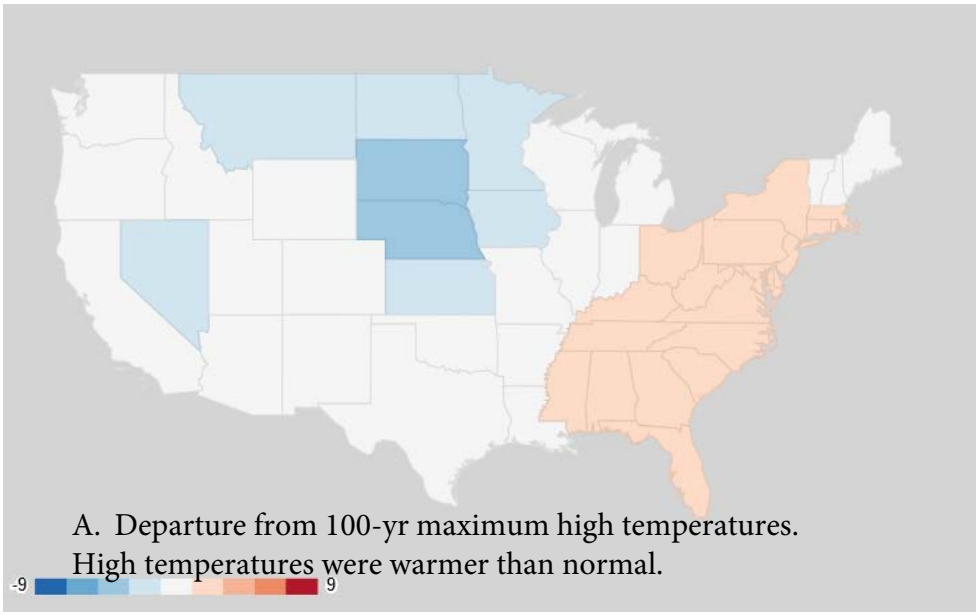
Dear Members:

Over the past few months (March – June), staff at the Southern Forest Nursery Management Cooperative have examined seedlings from 26 different independent sources from members, contractors and landowners to determine the underlying cause of seedling mortality or lack of seedling growth. Samples were sent to us at Auburn AL, from across the southeastern region of the United States (Georgia, Alabama, South Carolina, Louisiana, Texas, Florida, North Carolina & Tennessee) with several, seedling health issues observed.

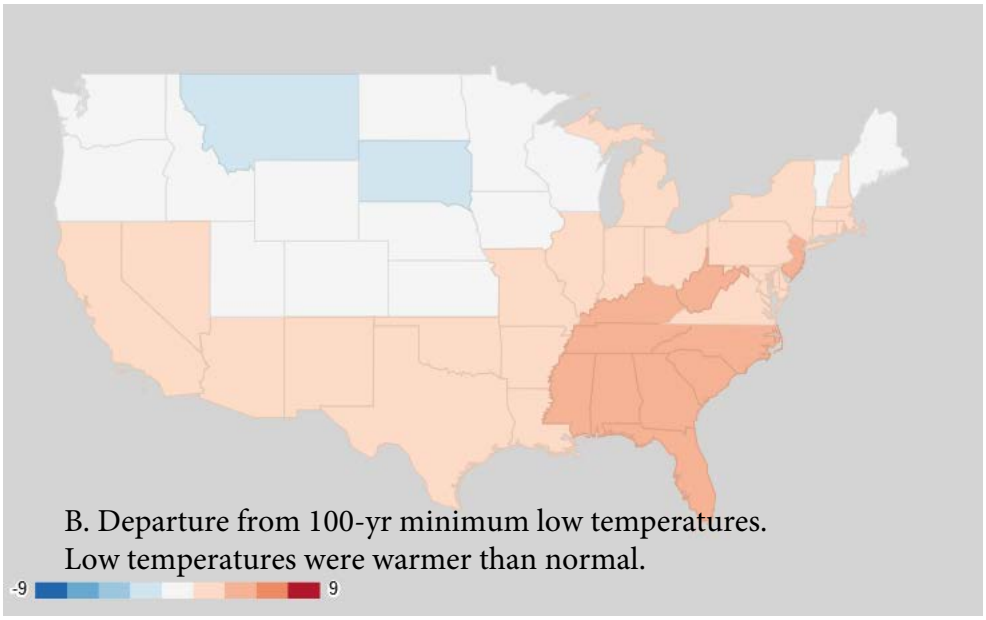
Although there was not a "single" event that we could assign to all the seedling mortality across the region, we have been able to document different weather events, at different locations at different times during the planting season. Thus, there appears to be a combination of factors namely that of environmental and planting factors contributed to the survival concerns reported across the region. Factors that negatively impacted the growth and survival of seedlings, and were attributed to seedling out-planting concerns in decreasing order of occurrence in samples examined include: 1) black, decay roots with extensive formation of lenticels on seedlings due to record or above average levels of precipitation across the southeast (Figure 1c), 2) symptoms of freeze damage on seedlings due to the two freeze events that occurred in January and again in March, 3) record or above average temperatures during the planting season (Fig 1 a & b) 4) poor planting operations (some samples with seedling RCD simply too small, some samples of shallow-planted "J" and "L" seedlings, trimmed root systems, seedlings planted in March) , and 5) insect feeding by Nantucket Pine Tip Moth and Pales weevil.

These 5 explanations, alone and in various combinations have contributed towards the survival issues observed. The poor environmental conditions (anaerobic conditions with too much precipitation and/or root death caused by freeze events) had a significant impact on root growth. Reduced root growth becomes a problem when the extended periods of warmth, following the water-logged event, initiates normal seedling physiology (late March early April). Without sufficient new root growth to support the shoot growth, the seedlings either die outright, or appear to just 'hang on' with little to no shoot growth for weeks.

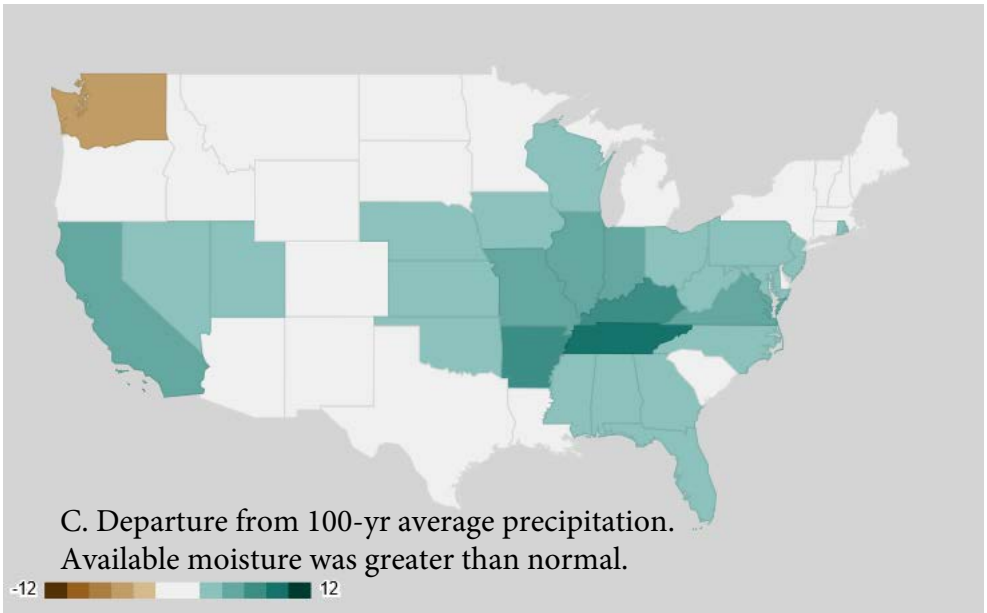
Late planting of seedlings also resulted in several issues seen this year, the planting weather is critical both at planting but also shortly after planting, so as to allow seedlings to establish and start new root growth. Seedlings can die quickly due to moisture loss from needles as the temperature, relative humidity and wind speed increase. Several seedlings examined this season were planted when temperature, relative humidity, wind speed or soil moisture content were either marginal or critical and not recommended for planting and optimized seedling survival.



A. Departure from 100-yr maximum high temperatures.
High temperatures were warmer than normal.



B. Departure from 100-yr minimum low temperatures.
Low temperatures were warmer than normal.



C. Departure from 100-yr average precipitation.
Available moisture was greater than normal.

Figure 1: Departure from 100-yr mean averages from December 2018 - March 2019