Influence of Heat Unit Accumulation and Low Temperatures on Pod Maturation: An Example from North Carolina during the 2020 Growing Season

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OVERVIEW AND SUMMARY

The number of heat units accumulated during the growing cycle can directly impact growth, development, and maturation of peanut. Additionally, low temperatures that are not lethal can slow maturation down to a point where further crop development is unlikely unless a prolonged period of warming occurs. Historically, practitioners have indicated that when daily temperatures are below 50 F for two consecutive days, pod maturation slows to a point at which further development does not occur even when temperatures moderate. Data supporting this assessment are limited. Temperatures during the harvest cycle of 2020 in North Carolina allowed researchers to observe whether or not cooler night temperatures prevented further development and maturation of pods. Observations at Lewiston-Woodville with the cultivar Bailey II showed that when temperatures on September 22 and 23 were slightly below 50 F, pod maturation did not increase appreciably throughout the remainder of September and October based on pod mesocarp color. Additional time periods with nighttime temperatures between 45 and 50 F were observed over that period of time and most likely contributed to lack of further pod development. These observations support the recommendation that when temperatures drop below 50 F for at least two consecutive days, increases in pod maturation are unlikely.

Figure 3-3. Heat unit accumulation for 2018, 2019, and 2020 relative to the ten-year average at Lewiston-Woodville, NC. Note that heat unit accumulation in August and September differed significantly during these growing seasons.

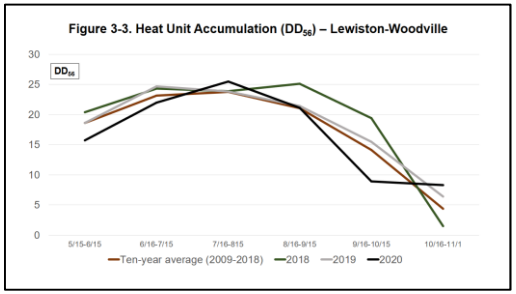
Figure 3-3. Heat unit accumulation and maximum and minimum temperatures at Lewiston-Woodville in 2019. Note that temperature did not dip below 50 F until October 12.

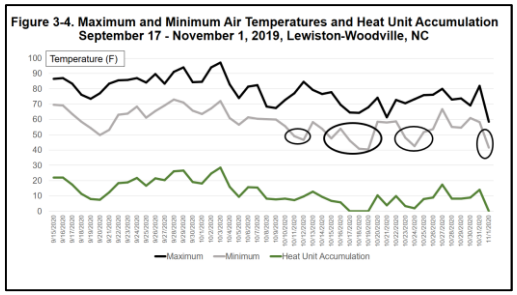
Figure 3-5. Heat unit accumulation and maximum and minimum temperatures at Lewiston-Woodville in 2020. Note that temperature dipped below 50 F for several nights beginning on September 22.

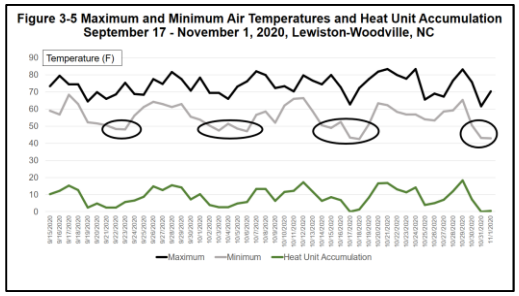
Figure 3-6. Pod mesocarp color for the variety Bailey II at Lewiston-Woodville in 2020. Note that pod maturity did not change in a major way from September 17 through October 15.

Figure 3-7. Note that pod yield was high for early June plantings compared with early May and mid-June plantings in 2019. Fall temperatures were conducive to late-season pod maturation.

Figure 3-8. Note that pod yield was low in late-May and early June plantings compared with early and mid-May plantings in 2020. The lower yield was due in part due to cooler temperatures in the fall that limited maturation.







ACKNOWLEDGMENTS

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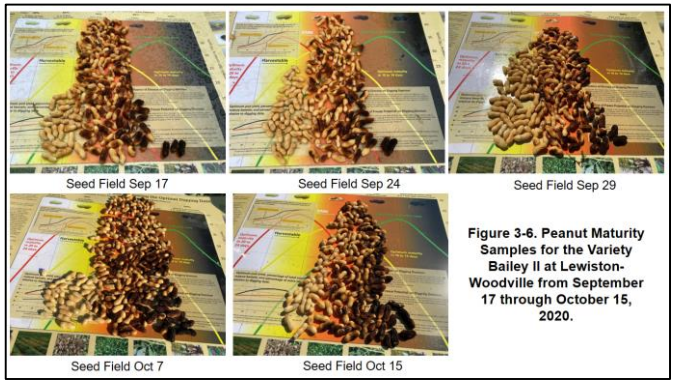

Figure 3-6. Peanut Maturity Samples for the Variety Bailey II at Lewiston-Woodville from September 17 through October 15, 2020.

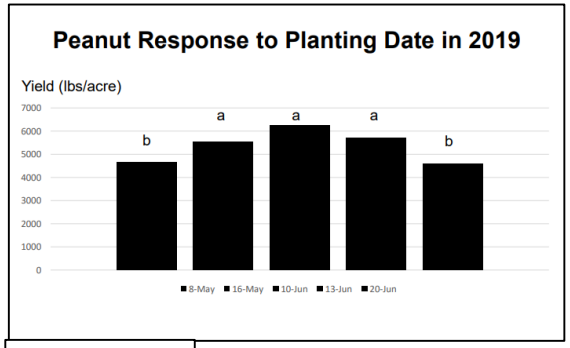

Figure 3-7

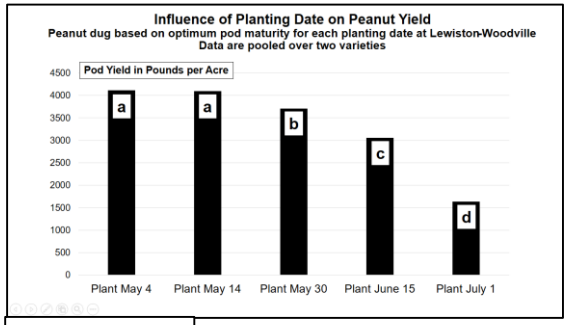

Figure 3-8