

## Double-cropping with forage sorghum and forage triticale in New York: Best timing for sorghum harvest and triticale planting

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Double-cropping with both warm- and cool-season forages in New York can have many benefits, including providing a source of forage yield in the spring that potentially leads to greater total season yields than a monocrop system, increasing rotation diversity, and providing year-round soil cover. Winter cereals such as triticale are great options for double-cropping in the Northeast, as they overwinter and can produce high forage yields in the spring. Yet, depending on weather and growing season condition, a winter cereal crop harvested for forage can delay corn silage planting to mid-May or later. Sorghum is a potentially useful alternative to corn silage for double-cropping rotations, as sorghum can be planted later than corn. While it is possible to harvest forage sorghum earlier than the recommended soft-dough growth stage without compromising yield, it was not known how sorghum harvest timing would impact total season yield of both forage crops in the rotation. Here we present findings of a field trial to evaluate the impact of sorghum harvest timing on the combined yield of forage triticale and forage sorghum in a double-cropping rotation.

### FIELD RESEARCH

A double-cropping study with

forage sorghum (brachytic dwarf brown midrib variety 'AF7102') and forage triticale ('Trical 815') was conducted at the Musgrave Research Farm in Aurora, New York, from October 2015 to June 2018. The study was initiated with triticale planting in mid-October, 2015. Each spring, the triticale received multiple rates of nitrogen (N) at dormancy break in mid- to late-April and was harvested in mid- to late-May at flag-leaf stage. Sorghum was planted between early and mid-June once the soil temperature stayed consistently above 60°F. Sorghum received either no N or 200 lbs. N/acre at planting, and it was harvested four times in the fall between early September and mid-October, approximately two weeks apart. Triticale was planted a day after sorghum harvest. Data is included from the plots that received 120 lbs. N/acre for triticale and 200 lbs. N/acre for sorghum, where N supply was not expected to limit yield of either crop.

### RESULTS

In 2016, sorghum yield was highest when harvested after mid-September (late-flower to early-milk growth stage or later), and the following triticale yield was highest when planted in mid-September (**Figure 1**). Because of the larger contribution that sorghum

had, overall total season yield did not increase after the mid-September sorghum harvest and triticale planting date that year. In the second year of the study (fall 2017 to spring 2018), sorghum yield was maximized at the last harvest date, and, as with the year before, triticale yielded highest when planted in mid-September. Total season yields were lower in the second year compared to the first year, most likely reflecting weather; fall 2016 was warmer and drier, while fall 2017 was cooler with higher rainfall. There were more growing degree days (GDDs) by mid-September 2016 than by the last harvest in mid-October 2017 (**Figure 2**).

### CONCLUSIONS AND IMPLICATIONS

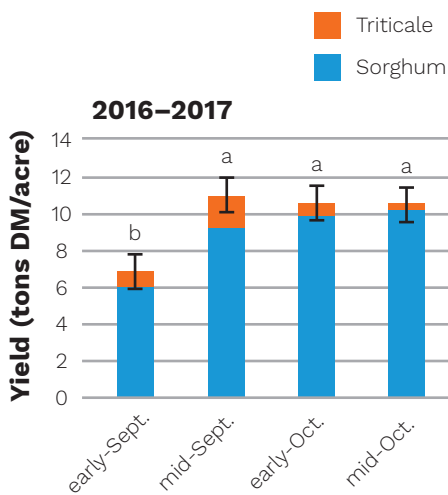
Forage double-cropping can be both economically and environmentally beneficial in upstate New York. Sorghum, a crop well-adapted to warm and dry climates, planted in early or mid-June will likely reach maximum yields earlier in years with more GDD (by 1,151 GDD in °C or 2,072 GDD in °F in mid-September 2016 in this study) compared to years with fewer GDD (such as 2017 in this study). We recommend that sorghum grown in New York during warm, dry years

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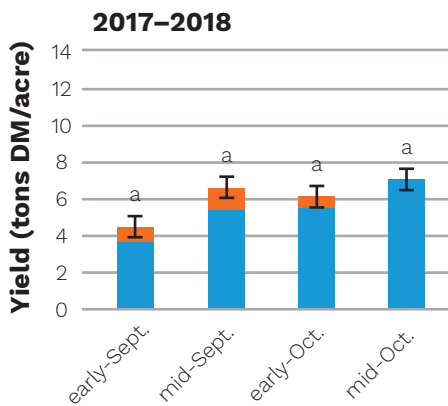
## Double-cropping with forage sorghum and forage triticale in New York: Best timing for sorghum harvest and triticale planting, cont'd from front

### FIGURE 1

Total season yield for a double-crop rotation study with forage sorghum and triticale in central New York from 2016 to 2018. Triticale was planted the day after sorghum harvests in the fall. Triticale was harvested at the flag-leaf stage in May. Sorghum was fertilized with N at planting (200 lbs. N/acre) and triticale was fertilized with N at dormancy break in the spring (120 lbs. N/acre).



**Timing of sorghum harvest/triticale planting**



**Timing of sorghum harvest/triticale planting**

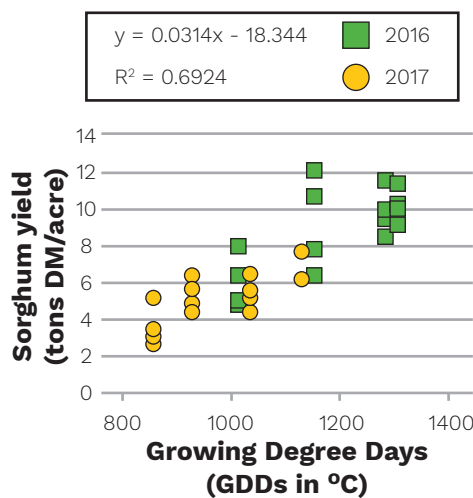
can be harvested once ~1,150 GDD (°C scale; 2070 GDD in °F scale) have accumulated. This can support both sorghum and triticale yields. If 1,150 GDD have not accumulated by the soft-dough growth stage (cool, wet years), harvesting sorghum at soft dough is recommended to maximize total season yield. ■

### FULL CITATION

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### FIGURE 2

Forage sorghum yield as related to growing degree days (GDDs) from 2016 to 2017. The GDDs were calculated by subtracting the lower threshold growing temperature for sorghum (10°C) from the average daily temperature (in °C). The average daily temperature was calculated by subtracting the minimum temperature from the maximum temperature and dividing by two:  $(\text{Temperature}_{\text{max}} - \text{Temperature}_{\text{min}})/2$ . To convert from GDD in °C used here to GDD in °F, multiply by GDDs in °C by 1.8.



Godwin, J.H. Cherney, D.J. Cherney, J.J. Meisinger, and T.F. Kilcer (2019). Double-cropping with forage sorghum and forage triticale in New York. *Agronomy Journal* 111:3374-3382. doi:10.2134/agronj2019.05.0386.

### ACKNOWLEDGEMENTS

This work was supported by Federal Formula Funds, and grants from the New York Farm Viability Institute (NYFVI) and Northeast Sustainable Agriculture Research and Education (NESARE). For questions about these results, contact Quirine M. Ketterings at (607) 255-3061 or qmk2@cornell.edu, or visit the Cornell Nutrient Management Spear Program website at: nmsp.cals.cornell.edu.

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