2018 Summer Annual Variety Trial

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THE UNIVERSITY OF VERMONT
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2018 SUMMER ANNUAL VARIETY TRIAL

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Warm season grasses, such as Sudangrass, and millet can provide quality forage in the hot summer months, when the cool season grasses enter dormancy and decline in productivity. The addition of summer annuals into a rotation can provide a harvest of high-quality forage for stored feed or grazing during this critical time. Generally, summer annuals germinate quickly, grow rapidly, are drought resistant, and have high productivity and flexibility in utilization. The UVM Extension Northwest Crops and Soils Program conducted this variety trial to evaluate the yield and quality of warm season annual grasses.

MATERIALS AND METHODS

A trial was initiated at Borderview Research Farm in Alburgh, VT on 8-Jun 2018. Plots were managed with practices similar to those used by producers in the surrounding area (Table 1). The previous crop was winter rye. The field was disked and spike tooth harrowed prior to planting. Fifteen varieties of summer annual species were compared (Table 2). Plots were seeded with a Great Plains small plot drill at a seeding rate of 50 lbs ac^{-1} for the sorghums, Sudangrasses and sorghum x Sudangrass crosses and 20 lbs ac^{-1}BT/F1 11.04 Tf1 0 0 1 464.5 454.15 Tm0 g0 G

RESULTS

Seasonal precipitation and temperatures recorded with a Davis Instruments Vantage Pro 2 weather station with WeatherLink data logger in Alburgh, VT are shown in Table 3. From June through September there was an accumulation of 2298 Growing Degree Days (GDDs) in Alburgh, which is 285 GDDs more than the 30-year average. Rainfall was below average for all months except for June which was approximately normal. Multiple extended periods without rainfall were experienced, the longest of which was more than two weeks. Temperatures, conversely, were above average for Jul-Sep but below average for June. Hot and dry conditions provided ideal growing conditions throughout the year resulting in a third harvest being possible in early October.

Table 3. Seasonal weather data collected in Alburgh, VT, 2018.

Alburgh, VT	**June**	**July**	**August**	**September**
Average temperature (°F)	64.4	74.1	72.8	63.4
Departure from normal	-1.38	3.51	3.96	2.76
Precipitation (inches)	3.74	2.43	2.96	3.48
Departure from normal	0.05	-1.72	-0.95	-0.16
Growing Degree Days (base 50°F)	447	728	696	427

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The highest yielding variety was Piper sudangrass which performed similarly to five other varieties. Protein also varied

sudangrass. Three other varieties produced yields over 4.5 tons ac^{-1} including Piper sudangrass, and Sugar Pro and Green Grazer V sorghum x sudangrass. The lowest yielding varieties were FSG 315 and Prime 360 pearl millet which produced less than 3.5 tons ac^{-1}. In terms of quality, Prime 180 pearl millet consistently had very high protein and low ADF and NDF contents, even into the late harvest. It remained high in quality at this late harvest better than the other millet varieties except for FSG 315. Figure 2 is divided into four quadrants by dotted lines signifying the average total yield and relative forage value (RFV) for the trial across the three cuttings. Varieties that land in the top left quadrant are those that produced above average yields but below average quality. Varieties in the bottom right quadrant produced above average quality but below average yields. Varieties in the top right quadrant produced above average yield and quality. The varieties that produced both high yield and quality over all three cuttings were Hayking and AS 9302 sudangrass. Wonderleaf and Prime 180 millet were close but yielded slightly less overall. However, RFV is a calculation based on ADF and NDF content and does not take other aspects of quality into consideration.

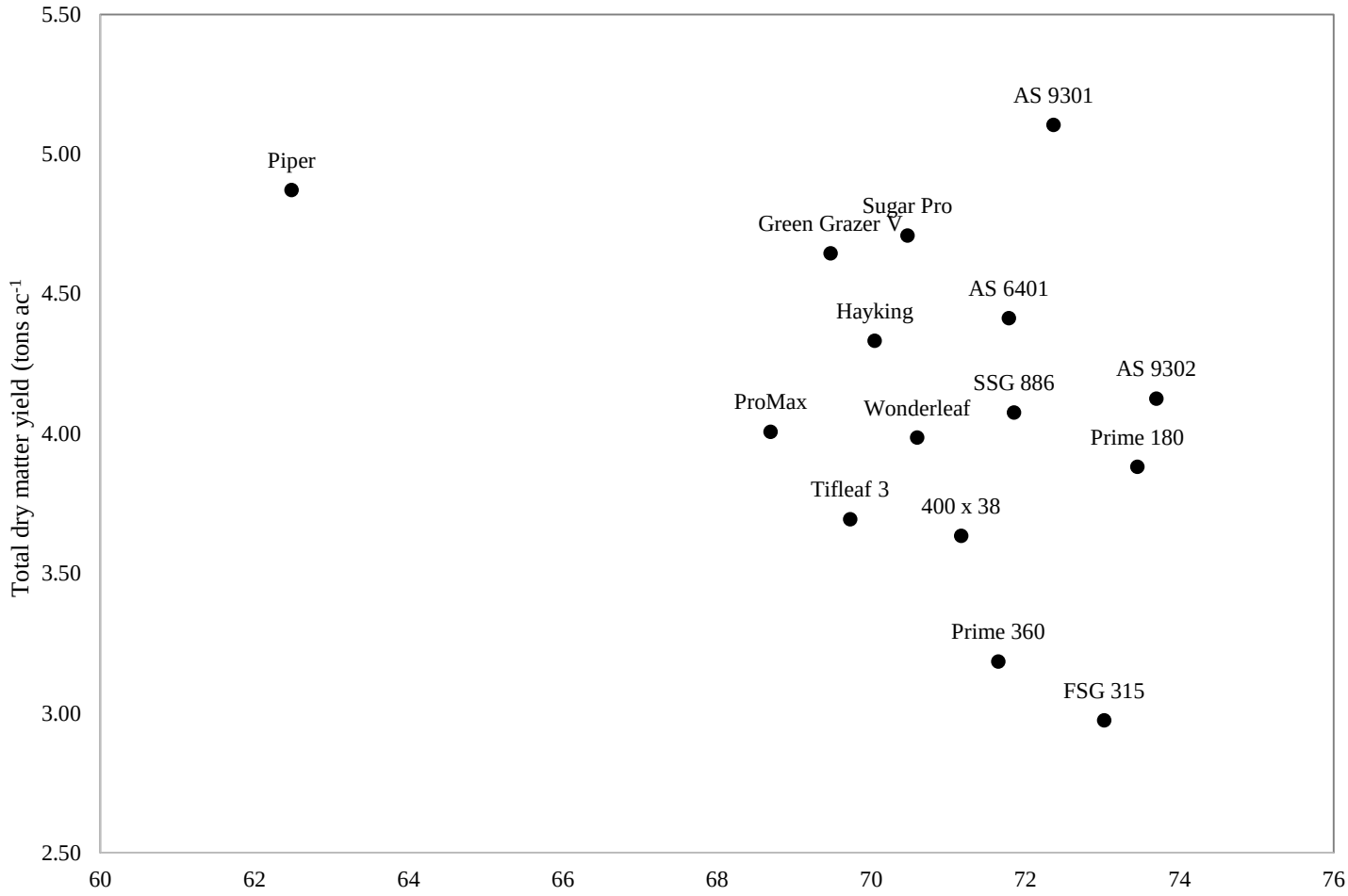

Figure 3. Total yield and average 48-hr NDF digestibility of 15 summer annual varieties across three harvests, 2018.

DISCUSSION

These data demonstrate the value of integrating summer annual forages into forage production systems in the Northeast. In a year where drought conditions diminished the yield and quality of perennial pastures and hay fields, summer annuals produced on average 4.10 tons ac^{-1} of high quality forage. Varietal selection is important as varieties differ in performance in terms of yield and quality. Piper sudangrass, for example, was one of the highest yielding varieties in the trial. However, its quality was substantially lower than all the other varieties. Piper is sold primarily as a summer cover crop. Purchasing improved forage varieties, despite potentially higher costs or lower yields, is important if your goal is to produce high quality forage.

With growing summer annuals, it is important to also be aware of the risk of nitrate accumulation and the presence of prussic acid. Nitrates are considered relatively safe for feed up to 5000 ppm, however, there is a risk of excessive nitrate accumulation under excessive fertility, and immediately after a drought stressed crop receives rainfall. Additionally, sorghums, sudangrasses, and hybrids may contain prussic acid, which can be toxic. To avoid prussic acid poisoning from summer annuals:

Graze when the grasses are at least 18 inches tall.
Do not graze plants during and shortly after drought periods when growth is severely reduced.
Do not graze wilted plants or plants with young tillers.
Do not graze after a non-killing frost; regrowth can be toxic.
Do not graze after a killing frost until plant material is dry (the toxin usually dissipates within 48 hours).
Do not graze at night when frost is likely. High levels of toxins are produced within hours after frost occurs.
Delay feeding silage six to eight weeks following ensiling.

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