The Forages and Pastures Symposium titled “Forage systems adaptable to dry conditions” was held on Wednesday, July 10, at the Joint Annual Meeting of the American Dairy Science Association (ADSA) and the American Society of Animal Science (ASAS) in Indianapolis, IN, July 8 to 12, 2013. The committee for this symposium comprised members of the Forages and Pastures Committee representing either ADSA or ASAS for the Joint Annual Meeting: Chair, Dr. Steven P. Washburn (NC State University, Raleigh), Dr. Matthew H. Poore (NC State University, Raleigh), Dr. Donald E. Spiers (University of Missouri, Columbia), Dr. Bradley J. Heins (University of Minnesota, St. Paul, stationed in Morris), Dr. Jeffrey W. Lehmkuhler (University of Kentucky, Lexington), and Dr. John K. Bernard (University of Georgia, Athens, located on the Tifton Campus).

The purpose of the symposium was to review impacts of recent droughts and other weather extremes on crops, forages, and livestock production systems and to explore efforts to improve forage options in dry conditions both by management and by selection of drought-tolerant forage species. The impetus for this symposium was the widespread severe drought in 2012, which brought comparisons to other severe droughts in the United States dating back to the time of the “Dust Bowl” in the 1930s.

The first speaker of the symposium was Dr. Paul Schmid (Purdue University, West Lafayette, IN), whose presentation “Between droughts and floods—Climatic effects on forage and livestock production systems” (Niyogi, 2013) was on behalf of Ms. Olivia Kellner and Dr. Dev Niyogi who co-authored the full manuscript for this symposium (Kellner and Niyogi, 2014). Their manuscript describes details about the 2012 drought as well as providing historical perspective on how that drought compared to other widespread droughts in the United States over the past 80 yr. Resulting low crop and forage yields in 2012 affected cattle feeding strategies and reduced cattle inventories leading to expected shorter domestic supplies of beef and upward pressure on prices of various crop and animal products. Planning for drought and drought mitigation includes risk assessment, use of historical information and modeling, and a need to understand potential links with other factors that can affect ecosystems.

The second presentation in the symposium, “Foraging through the dry times: Novel approaches to improving drought tolerance in forage crops,” featured Dr. Mel Oliver of the USDA-ARS Plant Genetics Research Unit in Columbia, MO (Oliver et al., 2013), in collaboration with USDA colleague Dr. Abou Yobi and Dr. John Cushman, at the University of Nevada, Reno. The presentation focused on the need for development of forage crops that can be productive with limited supplies of water and increased tolerance to drought. Their work has included efforts to understand the cellular processes associated with drought tolerance in various plant species and to incorporate those characteristics into viable forages for animal production. Of particular interest in their studies are species of the Sporobolus genus, which have been used successfully in environments that are either arid or high in saline content.

Dr. Steve Soderlund of LaSalle, CO, delivered the third presentation in the symposium, “Field experience with drought-tolerant maize” (Soderlund et al., 2013). Along with DuPont Pioneer colleagues Dr. Fred Owens and Dr. Chris Fagan, a full manuscript is included as part of this symposium (Soderlund et al., 2014). DuPont Pioneer scientists have been using combinations of phenotype and marker-assisted selection to develop maize plants that can yield more competitively under drought conditions. Such drought toler-
ancient is obtained through multiple plant characteristics including an ability to reduce overall evapotranspiration and the presence of root systems with increased capability for extracting water from the soil. Although grain and biomass yields are expected to decline in droughts, further adaptation of maize to drought conditions can be obtained by management strategies that include adjusting seeding rates, earlier planting, reduced tillage, shorter season hybrids, and limited but targeted irrigation.

The final presentation in the symposium, “Using mixtures of summer forages for improved forage yields in dry conditions” (Teutsch, 2013), was provided by Dr. Chris Teutsch, forage agronomist at Virginia Tech’s Southern Piedmont Agricultural Research and Extension Center, Blackstone, VA.

That presentation examined alternatives to managing potential environmental risk of maize planted alone for silage in the southeastern region of the United States. Over 2 yr (2010–2011), late May plantings of pure stands or mixtures resulted in more than double silage yields (35% DM) for mixtures compared to maize alone when at least 4.5 kg/ha sorghum was added to maize planted at 28,000 kernels/ha. Planting mixtures of maize and a more drought-tolerant forage sorghum may reduce risk of low yields during years of moderate drought.

With continued advances in monitoring patterns of weather and climate changes and better understanding of factors that contribute to those changes, improved predictability of extreme weather events might be expected. Research to identify key genetic and physiological characteristics related to drought tolerance of plants should lead to improved varieties of grain and forage plants capable of improved performance under drought conditions. Together with strategic management practices, there should be enhanced opportunities for economical production of forage crops in support of animal production systems in the event of probable future periods of extended drought.

LITERATURE CITED


