

## SOME THOUGHTS ON OKLAHOMA PLANTS AND SUMMER 2011'S EXCEPTIONAL DROUGHT

**Leslie E. Cole, D.V.M.**

Oklahoma has just had a summer of incredible heat and exceptional drought (D4), the worst such designation possible from the National Drought Monitor and marked by a menacing dark red on the drought maps they make. The impacts of this tough climate event can be seen everywhere one looks from the dormant or dead Blackjacks and Eastern Redcedars to the thin young crows, and felt in the economy and our communities.

We can set the stage for these musings by quoting Mr. Gary McManus, Associate State Climatologist, Oklahoma Climatological Survey.

Oklahoma is "... just coming off one of our driest you-name-the-period on record. The current drought originated in September 2010 with the arrival of La Nina in the equatorial pacific waters. This water year, which ended September 2011, finished as the second driest on record for Oklahoma with a statewide average precipitation total of 20.26 inches, 16.43 inches below normal. The driest such period on record was 18.69 inches from the 1955-1956 water year. For the Panhandle, west central, central and southwestern parts of the state, it was easily the driest water year on record. Southwest Oklahoma's water year average of 12.68 inches was more than 18 inches below normal and nearly 5 inches drier than the previous record low total of 17.45 inches, again from the 1955-56 water year."

And to gain perspective on the record heat of summer 2011, also from Mr. McManus...

"According to data from the Oklahoma Mesonet, the state's climatological summer, June 1 through August 31, ended with a statewide average of 86.8 degrees, obliterating the previous state record of 85.2 degrees from the summer of 1934."

Oklahoma has won the prize for hottest summer for any state since records began.

Oklahoma agriculture has experienced nearly \$2 billion dollars in losses due to the current drought, according to estimates by Oklahoma State University's Division of Agricultural Sciences and Natural Resources. The Oklahoma Department of Agriculture, Food, and Forestry estimates crop losses of more than \$953 million and cattle losses of about \$1 billion. Much of Oklahoma is still prairie grassland and well suited to produce protein from grazing herbivores like cattle. Oklahoma is home to the second largest beef cattle herd in the United States and the drought, with its withered grasses and forage and dried ponds, has hit the state's beef producers hard, particularly those west of Interstate 35 and in southwest Oklahoma, according to the Oklahoma Cattlemen's Association. These agricultural losses will be the highest ever recorded in a single year for our state.

As a veterinarian, I suspect that a lot of less than ideal hay will be fed and less than ideal areas will be grazed in Oklahoma this fall and winter. We could see increased oral injury in livestock due to the presence of higher numbers of mature grass seed heads in graze and late cut hay (like *Setaria* or foxtail grass) with stiff barbed bristles that easily penetrate flesh and are kept there by the barbs. Relatively small amounts of these types of

bristled seed heads in hay can produce these lesions (1.8% for *Setaria*).

A significant volume of hay is being shipped into Oklahoma from out of state. There could be toxic plants and seeds associated with this out of state hay that we don't normally see in Oklahoma. Those concerned about livestock health and Oklahoma native plants should be on the lookout for these aliens.

Drought stressed plants can accumulate or produce toxins not usually present under more "normal" conditions. Cyanogenetic glycosides that yield hydrocyanic acid (HCN-cyanide) upon hydrolysis are a concern in stressed *Sorghum* spp. (sudan grass, Johnsongrass, etc.), *Prunus* spp. and others. Nitrate levels in stocks, other forage or some hay are a concern as well.

Plants that accumulate or produce toxins are usually avoided by browsers and grazers; however, when said browsers and grazers are faced with eating dirt or that less than palatable toxic plant, the toxic plant gets eaten. Oklahoma has many toxic plants that can cause problems if ingested by livestock; for example, the loco weeds (*Astragalus* spp. and *Oxytropis* spp.), selenium accumulators (*Astragalus* spp. again and *Stanleya* spp.), oxylate accumulators (*Rumex* spp. and *Chenopodium* spp.) and saponin producers (*Phytolacca* and *Sesbania* spp.).

Even some of Oklahoma's smallest plants have been important in this past summer's heat and drought. "Blooms" or explosive reproduction of bluegreen algae in warm state waters this summer have made the headlines.

Individual cells of these organisms are microscopic but they are collected into colonies, filaments or masses of filaments. Cattle, sheep, horses, swine, dogs, cats, fowl, geese, wild and domestic ducks, game and song birds, fish, rodents, and small game have been killed by ingesting these smallest of plants.

Lack of water can eventually lead to catastrophic biological failures and death in plants. One can think about the wilting of leaves and decreased turgor pressure, hydraulic failure with stomata closure and reduced photosynthesis and the myriads of other adaptations, mechanisms and strategies that plants employ to survive the stresses of Oklahoma's wild climate and unique ecology. What I remember most about this year's drought was the amazing green-up of the grasses and the abundant fall flowers that followed the relatively meager fall rains. The native plants of Oklahoma are scientifically fascinating, true survivors, and incredibly beautiful.

Kingsbury, John M. 1964. *Poisonous Plants of the United States and Canada*. Prentice Hall: Englewood Cliffs, NJ.

National Agricultural Statistics Service (NASS). Oklahoma Field Office and the Oklahoma Department of Agriculture, Food, and Forestry (ODAFF). Oklahoma Agricultural Statistics 2011.

*ONPS*