Desert Plants

A quarterly journal devoted to broadening knowlege of plants indigenous or adaptable to arid and sub-arid regions, to studying the growth thereof and to encouraging an appreciation of these as valued components of the landscape.

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Editorial

The Importance of Grasses. In this issue of *Desert Plants* E.M. Schmutz, M.K. Sourabie and D.A. Smith review the vegetational dynamics and management of range grasses in southern Arizona at the Page Ranch research facility of the University of Arizona. Also, J.R. Reeder and C.G. Reeder provide extremely valuable "nuts and bolts" additions to our knowledge of the grass flora of Arizona. Subscribers to *Desert Plants* are to be commended for financially supporting the publication of "nuts and bolts" articles on such economically important families as legumes (last issue) and grasses (this issue). Without legumes and grasses there would be no *Homo sapiens* to study and appreciate the desert! Although man may not "live by bread alone" in the spiritual or psychological sense, the old saying "Man is grass" or "Life is grass" have deep and true meaning.

Research on the grasses of arid regions promises tremendous advances of breakthrough proportions. For example, the halophytic grass *Distichlis palmeri*, which grows on land adjoining estuaries inundated by the tide in the upper portions of the Gulf of California (in the center of the Sonoran Desert), yields a grain similar to wheat. Can we grow this as a crop plant using seawater for irrigation? To show the potential of lowly grasses for improving man's lot on earth we need only to turn to Corn *(Zea mays)*. In a previous issue of *Desert Plants* Corn was shown to be a recently developed crop descended from a simple wild grass. A few enlightened historians recognize *Zea mays* as the golden asset which allowed the present wealth of the United States to develop! It is said that 5.5 billion bushels of Corn are produced annually in the United States, equivalent to more than 15 million bushels per day. Although we eat roasting ears, creamed corn, tacos, popcorn and Fritos directly, it has been estimated that we eat perhaps a pound of corn at each meal in the transformed substance of beef or pork, eggs, milk, butter or other foods. Was it the advanced agricultural and industrial technology of the United States which allowed the successful research and development program which successfully exploited *Zea mays*? Most experts on the history of science think rather that it was the successful research and development program adapting *Zea* to the environment of the American heartland that eventually resulted in the great economic, agricultural and industrial success of the country! The cornbelt happened to have an environment with a pre-existing potential for growing *Zea*, just as Ireland had turned out to have an environment conducive to growing potatoes.

Just as a good case can be made for the successful development of the United States having hinged on the selection, matching and adapting of a single grass species to what became the cornbelt, so too do we have hope that less developed countries and regions may eventually find suitable species which can be exploited to allow their full economic, agricultural and industrial development as well.

The United States has been doubly blessed. In a number of regions where *Zea* growth is marginal because of lack of rain or adequate sun (or both), or seasonally hot and then cool, varieties of Wheat *(Triticum aestivum, T. durum)* have been developed which are extremely productive. Types of Barley *(Hordeum vulgare)* have been matched to high altitudes and latitudes with cold weather and short growing seasons. Rye *(Secale cereale)* does well under cool conditions and produces on even poor soils. Oats *(Avena sativa)* produce at climatic extremes and adapt to a wide range of soil types.

Where U.S. climate is too hot and dry for *Zea*, we have developed hybrid cultivars of *Sorghum*, that ancient grain-plant which fed the biblical Ninevah on the Tigris River.

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mann Lovegrass and the Poverty Threeawns were the most resistant of the perennial grasses to summer drought and both survived fire, Lehmann Lovegrass by revegetation and Poverty Threeawns by withstanding burning and/or by revegetation. Vine-mesquite, which grows in swales, also survived drought and burning, probably because of better soil moisture conditions. Therefore, these latter three species were the most stable of the perennial grasses for this area.

Perennial forbs, although little affected by summer drought or fire, were inversely affected by grass competition and therefore under good grass management they would make up a minor constituent of the forage complex on this site.

In summary, wide fluctuations in grass cover and marked increases in tree and shrub cover occur on the desert grassland even under complete protection from livestock grazing. Therefore, for range improvement to occur on this site, good grazing management combined with an effective means of Mesquite control plus natural or artificial revegetation of drought and fire resistant native or introduced grasses will be needed to protect this area against erosion and make it possible to use it for wildlife and livestock production. Based on this study Lehmann Lovegrass and/or related crosses such as Cochise Lovegrass *(Eragrostis lehmanniana* x *trichophora)* are leading candidates for this low elevation desert grassland site. For higher elevations where drought cycles are not so critical, mixed native species appear more desirable. In any case some form of continuing Mesquite control will be necessary to maintain productivity.

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Sorghum germplasm has been like putty in the hands of the plant breeder. We have reduced the internode length to make dwarf varieties easily harvested with a combine. We have "sorgos" with sweet stalks that yield syrup. We have grain types (Kaffir, Milo, etc.) used in making feeds for poultry and cattle. We have forage types like Sudangrass used for pasture, hay and silage. There are "broomcorn" types which have been selected to yield the stiff but tough straw for our traditional household broom.

There are many other grasses of great importance. The large number of field grasses nourish our beef animals and milk cattle. Small-grained crop grasses are lumped together under the name "millet." The average American is most familiar with them as the chief components of the birdseed sold in pet stores. They also are grown for forage and for mixing into stock feed.

The overall importance of grasses to the world's economy is staggering. Aside from the species discussed above there are heavy-weights such as Sugar Cane *(Saccharum officinarum)* and Rice *(Oryza sativa)*. Rice alone is said to feed half of the world's population! We have given the special name "cereal" to the grasses which have been adapted by man to yield enlarged easily harvested grains, adapting the name from the Greek goddess Ceres, the giver of man's staff of life. Although we have made some strides in adapting existing cereals to irrigated agriculture in arid lands, we have spent precious little time doing the reverse—looking for adapted arid land grasses to make into new cultivars. This latter approach has much to offer and may prove to be the breakthrough field of the future! It should theoretically be more advantageous to create a cereal or forage from a grass already adapted to arid lands than to use large amounts of fresh water for irrigating non-arid cereals in arid lands. Over 420 kinds of grasses grow wild in Arizona alone and more in other arid regions. We need to thoroughly screen these for potential use in bettering the lives of desert dwellers.