

Editorial

Rational Utilization of Desert Resources

Deserts occur where replenishment of moisture chronically lags loss by evaporation and transpiration. Such regions are reckoned among the harshest of Earth's environments for plant growth. A geographer once suggested that *desert* be defined as "a region in which crops require irrigation using water from an external source."

Proximity to the Tropics. The classic deserts of the world tend to occur in the "Horse Latitudes" near 30°N and 30°S, only eight degrees from the tropics of Cancer and Capricorn. High parameters of sunlight and heat are assets shared by these deserts with the tropics. Not shared is an abundance of water, a commodity which owes its geographic pattern to evaporation from tropical oceans between 22°N and 22°S and also to jet-stream exchange with colder polar air and consequent precipitation. In the intermediate desert-prone Horse Latitudes, however, tropical air having already ascended, cooled, lost its moisture and increased in density, subsides and exerts a desiccating influence on the land. The desert-prone latitudinal belts have special problems. Utilization by man can increase desertification but effective management can reverse the process.

Water. Water is a precious commodity in the desert. Rivers and their vegetation are inseparable assets of the deserts they flow through. Supply and demand dictate conservation and care in utilization of water. Two thousand years ago prehistoric Hohokam of the Sonoran Desert irrigated plants by extensive systems of canals using river flood water from snow-melt in the mountains. Today in that same desert, dams on the Colorado, Gila, Salt, Sonora, Yaqui and Mayo Rivers halt flood waters on their way to the sea and allow them to be apportioned to the fields in a rational manner. Water-harvesting agriculture, not utilizing river water or ground water, was discussed in an article on the Saguaro harvest and crop cycle of the Papago in a previous issue. Water-harvesting techniques are also adaptable for use by the desert gardener.

Sunlight and Heat. Chief among the abundant assets of deserts must be reckoned sunlight and heat, factors which promote plant growth but which are not themselves sufficient to insure it. Increased sophistication in management of water and of fixed nitrogen could allow more effective exploitation of sunlight and heat for plant growth.

Desert Plant Life Forms. Of great importance among desert resources is the unique unexploited germplasm of desert plant life forms and strategies for survival which have proven productive of biomass under the most adverse of conditions.

Nitrogen Fixation Systems. Desert legumes represent a special resource. Their tiny flat leaves fall to

the ground and stick to each other and to the microtopography to form a true leaf-litter which aids penetration of water and becomes incorporated into the soil to provide both fixed nitrogen and humus. In addition, crusts of soil algae and lichens stabilize the soil surface and provide nitrogen.

Unleached Desert Soils. Desert soils are generally not significantly leached of the minerals necessary for plant growth. This represents a potential advantage for plant growth over humid regions.

Lebensraum. Mankind evolved from a hunting and gathering creature into a veritable *agriculturalis* facies of *Homo sapiens*, concentrating populations where crops could be easily grown. Division of labor and the Industrial Revolution produced an *industrialis* facies of *Homo* amid the *agriculturalis* mainstay. Competition for lebensraum and the absolute dependence of *industrialis* on *agriculturalis* resulted in a peaceful solution whereby *industrialis* exploited space vertically in a manner compatible with horizontal *agriculturalis* utilization of the landscape in productive regions. But now a true *senilis* facies of *Homo* is emerging as a major cultural segment of mankind, depending exclusively on *agriculturalis* and *industrialis* and not requiring productive land. The *senilis* facies finds suitable lebensraum in the sunbelt of the Horse Latitudes where agricultural and industrial land use is less intense and again a peaceful solution to population pressures is possible.

But each year some of the best land of the Sonoran Desert is removed from production of crops and converted to homesites, mobile home villages and support facilities. The once "inexhaustible" availability of desert land and the insatiable desire for lebensraum have resulted in massive urban sprawl in central Arizona. In retrospect the influx of retirees seeking a place in the sun could have been predicted as logical results of the Social Security Act of 1935 and the Antibiotic Revolution. Theoretically it would be best for these warmth-seekers to live on sunny slopes of hills or bajadas in homes landscaped with truly desert plants and to leave the agricultural land near rivers for its important role in the scheme of man's sustenance.

Need for Management. Arid ecosystems are fragile. In the remote Gran Desierto of Sonora where the Hiach-eD O'odham once lived, off-road four-wheel drive recreational vehicles break the algal soil crusts and desert food plants are no longer respected or harvested. But the Gran Desierto has something to teach us and eventually will. In general, mankind seems to be learning to respect the desert environment and its resources, as can be seen from work in progress involving revegetation of mining areas, protection of endangered plants, and research on erosion-resisting ground-covers.