



Arid Climates and Plant Research Link Brazil's Northeast and U.S. Southwest

Brazil: big debts, coffee, Pele, Carnaval. We don't hear much else about this country the size of ours. It can be a surprise to learn that the nation of the Amazon is also the home of an extensive arid region. This region in Brazil's Northeast is important to the American Southwest because substantial research projects in each region are developing native arid-land plants as potential crops. The knowledge and the plants that come out of these projects may bring benefits shared by both regions.

Northeast Brazil is poor and underdeveloped compared with modern southern Brazil. Strengthening the agriculture of the Northeast may help in the long run to stabilize the nation's economy, especially by reducing dependence on imported petroleum. Right now, Brazil's high foreign debts threaten to shake international economics hard enough to be felt in Arizonans' family budgets. However, Arizona's ties to Brazil's arid region are more direct than the web of global finance.

Northern Brazil has a coastline area, less than 60 miles wide, where moderate temperatures and adequate water — with occasional short-

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Photograph: The plants around Dr. José Beserra de Oliveira typify the varieties in the arid inland of Brazil's Northeast: tall thickets where leaves are shed for summer. (Photo by Cathleen Barczys.)

The author is a UA graduate student who worked with Beserra de Oliveira and other Brazilian plant researchers last summer through a grant from The Tinker Foundation.



ages – prevail most of the year. On the coast is Fortaleza, home of the Universidade Federal do Ceará. This university has had strong ties with the University of Arizona since the time of a joint agricultural development project sponsored by the U.S. Agency for International Development in the 1960s and '70s.

In an hour's drive inland from Fortaleza, the countryside turns into arid, brown hills. Scattered fields of beans and corn, cattle grazing on scarce forage, and a few plantings of cotton show the agriculture from which most people in this area scrape a living. The region relies on agriculture and the agriculture relies on surface water, collected from natural runoff into any arroyo or depression that can be barricaded with an earthen dam. The area gets about two feet of annual rainfall, compared with one foot in Tucson (and with four feet in Fortaleza), but it seems even drier than Arizona's farming areas because it lacks the water-conserving technology and the groundwater that are used in Arizona.

Brazil's research program in arid land plants stems both from the need to make this region more productive and also from the nation's push to reduce dependence on foreign oil. Already, all gasoline sold in the country is mixed about three-to-one with alcohol that comes primarily from sugar cane, and 80 percent of new cars run on straight alcohol. Researchers are looking for crop plants that can be used for alcohol and need less water than sugar cane does. They are also evaluating varieties of arid-land plants for other types of energy production and for other uses, including forage, industrial chemicals and even medicines.

Just as some researchers in Arizona are testing drought-tolerant plants from South America, Brazilians' tests include several North American plants. Interestingly, some of them appear to do better in Brazil than they do in their native North American regions. One example is jojoba, which has been planted in field tests throughout Northeast Brazil. Jerusalem artichoke is another. This root crop, in preliminary tests, yields about twice as much alcohol per acre as the 375 gallon-per-acre average for sugar cane grown in Brazil.

Brazilian researchers are also looking at their native plants. A recent project evaluated five considered best bets for energy production, including types of babacu palm and cassava for alcohol, euphorbia for petroleum substitutes and water hyacinth for biogas. A type of shrub called marmeleiro, which rapidly grows over disturbed land, was judged to have more potential for chemicals than for energy.

Still underway is a five-year study of the growth patterns of 300 types of native plants at an inland ecological preserve. Such information is necessary for further research and commercialization work. In another project, researchers are checking the antibiotic activity of several native plants used in regional folk medicine. Shoot tips of guava plants appear effective in early tests.

The University of Arizona's long association with the Universidade Federal do Ceara continues to bear fruit. Leaders of several of the crop-development projects in Northeast Brazil are UA agricultural graduates, including Dr. José Beserra de Oliveira in the 300-plant study, Dr. Francisco Aécio Guedes Almeida on the Jerusalem artichoke project, and Dr. Raimundo Gladstone Monte Arago in jojoba research. Benefits can return to the American Southwest, too, in increased understanding of arid land plants and, perhaps, in a new selection of potential crop plants.