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Preserving our genetic resources

The remarkable diversity and productivity of agriculture in California is an established, widely recognized fact.

Perhaps not as well known is the fact that not one of the more than 200 crops grown commercially in this state is native to California. For that matter, only a handful of the 1,000 commercially grown crop plants from which the United States derives the major portion of its food and fiber are native to our country. All the others originated elsewhere and were introduced to our land—by Indian tribes moving north from Mexico; by early explorers and colonists who, when cautioned that the new world was woefully lacking in useful food and fiber plants, brought with them seed of their own crops; and by our government which instructed American Consuls abroad as early as 1819 to send useful plants back to the United States.

The adaptation of these crops to our conditions is an amazing scientific achievement, as well as a complement to our varied and productive environment. However our dependence on plant introductions from other parts of the world has not abated. If anything, the need for new raw materials is greater than ever, and will continue to increase as the needs of a hungry, overpopulated world give ever greater urgency to the development of new, higher yielding, pest resistant, stress tolerant, and better quality crops.

We have only just begun to tap the resources of the plant kingdom. Fewer than 10 percent of the world's 300,000 species of higher plants have been screened for any purpose, and only about 1 percent have been thoroughly screened for possible use by man.

In a real sense, our successes in developing new cultivars have put us in a vulnerable position in which a narrow genetic base has placed many of our most important crops in jeopardy. New varieties tend to be widely adopted, resulting in a uniformity that makes broad areas susceptible to the same destructive forces.

The Agricultural Research Service of the U.S. De-

partment of Agriculture, which shares responsibility with cooperating State Agricultural Experiment Stations for the National Germplasm System, states that if we had to rely only on the genetic resources now available in the United States for the genes and gene recombinants needed to minimize genetic vulnerability of all crops into the future, we would soon experience losses equal to or greater than those caused by southern corn leaf blight several years ago—at a rapidly accelerating rate across the entire crop spectrum. Advances in crop improvement would be slowed and would be enormously more costly.

There are some who say the large gaps in our base of genetic diversity can be bridged adequately by new techniques in plant breeding—by genetic engineering involving DNA recombinants, by tissue cultures, and by chemical or radiation-induced mutations. Successes such as the recent development in California of a short-statured rice through radiation-induced mutation are proof of the value of these techniques in plant improvement. Exciting as these developments may be, however, genetic engineering is still in its infancy. We must not yet abandon basic genetic resources, particularly the collection and conservation of wild species and primitive varieties of plants that carry the genes for traits we may desperately need in the future.

Many of our eminent scientists have built and maintained extensive individual germplasm collections, primarily for use in their own research activities. Even though effective plant breeding still requires the skills and imagination of the individual researchers, the state of science today also requires broad, inter-disciplinary teamwork and centrally supervised facilities to oversee and administer the exploration, collection, and conservation of genetic resources.

To meet the needs for future gene banks, I am pleased to report here that discussions are underway to establish such facilities at our Davis and Riverside campuses. We believe these repositories would be a major contribution to germplasm conservation activities that would benefit people throughout the world.