

NEW PATTERNS IN PLANT BREEDING



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PLANT BREEDING is evolution directed by man; it is the shaping of plants to serve the needs of mankind. All of our crops are the products of plant breeding, much of it done thousands of years ago as primitive societies selected (perhaps unconsciously) seeds from the best plants for sowing in the next year. The evidence suggests that these primitive plant breeders were women, and not men. At any rate the plants that were then molded to the needs of man provided the surplus food resources necessary for the development of arts, crafts, urbanization and other features of early civilization.

Civilizations still depend on the plant breeder to preserve and improve the crops we now have. An expanding world population that is becoming more urbanized and industrialized places new demands on the agriculturist and, through him, on the plant breeder. Food products must be more abundant, better balanced nutritionally, cheap to produce, transportable over long distances, storable for long periods, and adaptable for use in new products. The plant breeder is also concerned with many non-food crops including fiber crops, ornamentals, and forest trees—as well as lower organisms such as mushrooms, yeasts and bacteria.

The impact of plant breeding on the world's supply of rice, wheat and corn is well known. The benefits of plant breeding in California in terms of better varieties of tomatoes, strawberries, citrus, grapes, cotton, wheat, barley, and several other crops can be measured in millions of dollars annually to the agricultural industry and the consumer.

There is no question about the need for more plant breeding. The question is: Who will do it? Private companies have expanded their efforts, and now provide most of the new varieties of some crops such as corn, sorghum and several vegetable crops. They will undoubtedly extend their programs to include more crops.

However, it should not be assumed that the need for the plant breeder associated with universities, or with the U. S. Department of Agriculture, will decrease. The need may actually increase, as the public plant breeders integrate their re-

search with expanding breeding programs of private companies. The focus will be more on major changes in plants—having in mind the needs of both the farmer and the consumer. Some of the major roles of the public plant breeder are, and will be:

- The development of varieties where needs are not being met by private companies.

- The development of radically different plant types adapted to, or permitting new systems of farming.

- The development of varieties that are more efficient in the capture of radiant energy.

- The development of higher and more extensive levels of resistance to pests, and the study of the genetics and chemistry of resistance.

- The improvement of quality of foods, by changing the balance of different components, or the elimination of toxic substances.

- The development of plant types with less waste, thereby reducing pollution.

- The adaptation of established crops to California, or to different areas of California.

- The development of plant types that will provide better conservation and utilization of range and wildland areas for improved livestock production and recreation.

- The development of new crops from existing crop species or from wild species (a process requiring a great deal of time).

- The development of plant types that will improve the environment about the home, in parks, on highway margins, and in areas scarred by man.

- The collection and preservation of germ plasm of crops—the gene banks that can be drawn upon as new needs arise.

The universities have two additional roles, both important. One is the training of plant breeders, both as students in the universities and as practicing plant breeders interested in refresher type extension courses. The second role is in the advancement of the science of plant breeding, thereby making all plant breeding programs more efficient and predictable.