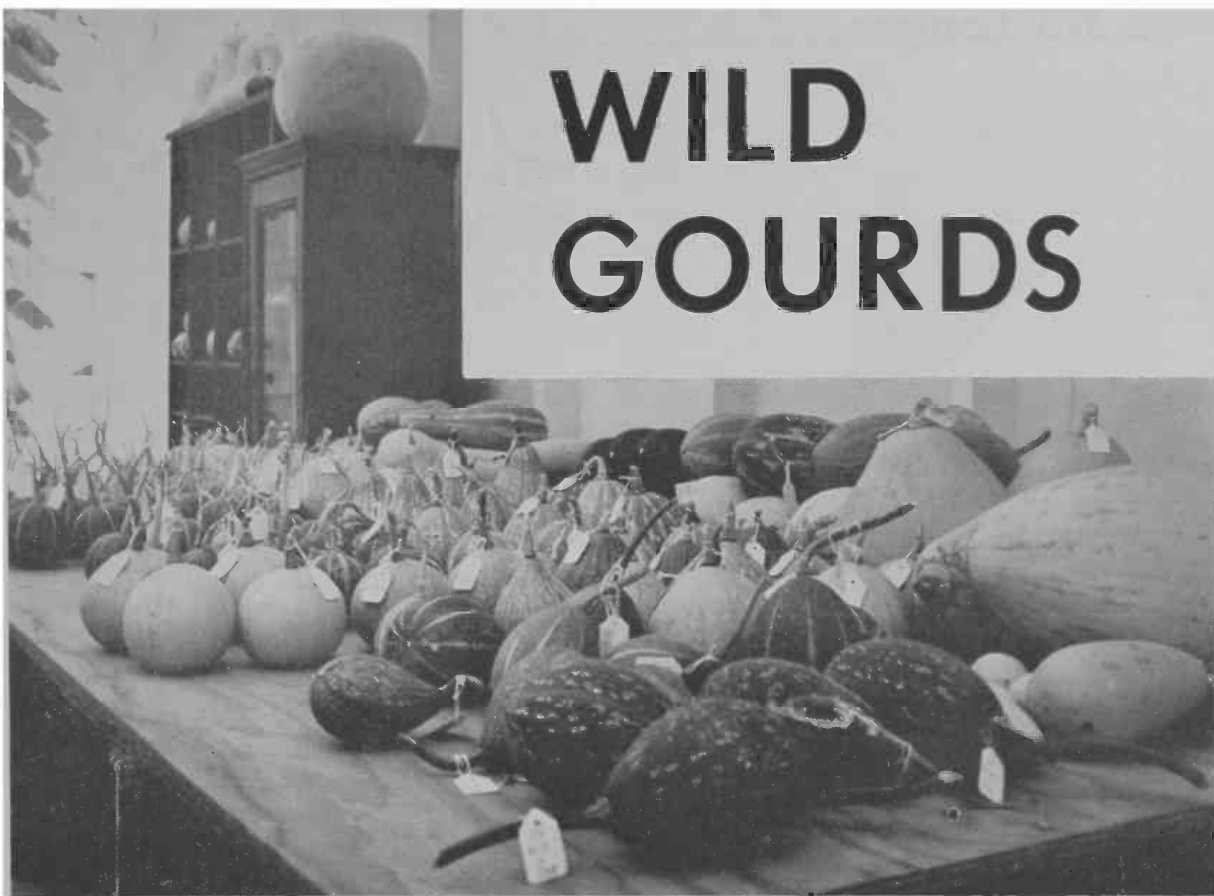


WILD GOURDS



AT LEFT is a collection of the odd-shaped squash resulting from the breeding program.

from Species Y to Species Z and then from Species Z to the cultivated Squash X.

In order to study the relationships between the many different species of gourds, squash and pumpkins, a greenhouse has been constructed that will permit the creation of an artificial climate in which all of the species will grow at the same time. This will permit an intensive study of the cross-pollination of the species, and of the barriers within the species that prohibit cross-pollination.

In 1961 the project was initiated and 12 different species were grown. Over 600 hand pollinations were made, resulting in 220 fruit set on the vines. Some 174 of the fruit set were crosses between species, the remaining 46 being self-pollinated fruits. The 174 fruit set represented 43 interspecific crosses but viable seed were recovered for only 23 interspecific crosses, which was considered a major step.

Key to Pumpkin and Squash Improvement

W. P. Bemis

In the gourd family, *Cucurbitaceae*, there is the genus *Cucurbita* which represents the pumpkins, squash and gourds. This group of plants is native to America, having their center of origin near Central America. They have been utilized by man as a source of food since 7000 to 5500 B.C.

Since man has realized the food value of these plants for such a long period, there has been a long history of selection for the edible types. This selection has been so intense that the cultivated species of today can no longer be found as the wild species they once were.

Only their wild counterparts, of which many species exist, are found today. The wild species of today range from the Central and South American tropics to the arid deserts of Arizona, each species being adapted to a particular climate.

Will No Longer Cross

There have probably been many thousands of plant generations since the various species were evolved. This has resulted in the accumulation of enough differences between species so that under natural conditions they will no longer cross-pollinate between themselves. This, plus the geographical separation of the species, has led them to become distinctly different from each other.

The wild species of today are non-edible as such, but many of the species do have desirable qualities, such as resistance to disease, perennial growth habit and

drought and heat tolerance. Characteristics such as these, if incorporated into existing cultivated squash and pumpkins, would increase the commercial value of the crop and give them a wider range of adaptation. The problem, however, is one of being able to transfer these characteristics through cross-pollination between species which normally will not cross-pollinate.

Do It Step By Step

For example, Species X is a cultivated squash but is very susceptible to powdery mildew. Species Y is immune to powdery mildew but is a wild gourd. Attempts to cross-pollinate Species X and Y have resulted in failure. However, a third species, Z, a wild gourd susceptible to powdery mildew, will cross-pollinate with Species X or Y. It will then be possible to transfer the powdery mildew resistance

Many Crosses Made

In 1962, 14 different species were grown in addition to the 23 hybrids from the 1961 season. One thousand fifteen hand pollinations were made, resulting in 700 fruit set on the vines. The extent of the progress made in 1962 will not be realized until the seed from the fruit has been examined and germinated.

This type of research study is essentially an attempt to unravel the complex system of interspecific barriers that nature has taken hundreds of years to create. Once this has been accomplished, plant breeders will be able to utilize the desirable characters present in the wild species populations and improve the squash and pumpkins that exist today.

A VERITABLE JUNGLE of gourd vines fills the special greenhouse which Bill Bemis uses for this cross-breeding project.



The author is a professor of Horticulture.