

show a much more satisfactory composition than would be indicated from the appearance of the roots.

RESULT OF BACK CROSS (NORTH SEA HYBRID x DOMESTIC BEET 12028)

	<u>Family #550</u> <u>(from 12028)</u>	<u>Family #546</u> <u>(from Dahlberg 4)</u>	<u>Family #521</u> <u>(from Dahlberg 3)</u>
Number of Beets	20	18	37
Avg. Weight in ounces	12.1	13.4	7.8
% Sugar	16.4	16.5	15.2
Apparent Purity (Brix)	89.3	90.4	89.9
Leaf Spot Reading Sept. 17	4.0	2.0	3.0
" " " for U.S.#217			3.1

WILD BEETS IN CALIFORNIA

Eubanks Carsner, U. S. D. A.

Annuals of the genus Beta occur in several coastal counties of southern California and also in the central part of the state near San Jose. These plants appear to be hybrids between cultivated sugar beets and wild forms of foreign origin. They persist without cultivation. They are subject to the same diseases as the sugar beet and may have some economic interest on this account.

A distinctly wild type of beet occurs in several scattered places in the Imperial Valley. It is dependent on irrigation water for survival. Presumably it was introduced with seed from Europe. At present it does not appear to be of economic importance.

GREENHOUSE OBSERVATIONS OF WILD BEET SPECIES

F. A. Abegg, U.S.D.A.

A demonstration of wild beet species.

POSSIBILITIES OF IMPROVING CULTIVATED VARIETIES
OF BEETS OF SUGAR BEETS BY HYBRIDIZATION WITH WILD TYPES

C. W. Doxtator, American Beet Seed Company

Intergeneric and Interspecific crosses in crops are, in general extremely difficult to make, and if successful the progeny is likely to show a high degree of sterility. The plant breeder, therefore, has been limited to a great extent in attempts to produce more suitable cultivated types, to hybridization

and selection within a species. In many cases however, species crosses have real economic possibilities and for this reason workers in the field of plant improvement in recent years have given a good deal of attention to this problem.

In the Genus Beta, the so-called wild species do offer some promise in the breeding program. Resistance to Cerospora leaf spot has been observed in *B. maritima*. There is also the possibility of obtaining more resistance to the Curly Top disease and resistance to Downy mildew from wild types. Some species show marked resistance to drought conditions, as well as adaptation to saline soils. Wild types also show adaptation to different altitudes and to different temperature conditions. The characteristic of the single germ seed ball is also an important property and may be of value in beet improvement work. Other desirable characteristics are likely to be observed when more varieties of wild types are collected and their progenies critically studied.

The possibility of success in the transfer of desirable wild beet characteristics to the sugar beet depends on many factors. The difficulties of making the cross, and the sterility of the hybrid are the first difficulties to be encountered. Backcrossing the hybrid to the sugar beet parent appears to be the most promising breeding method for rapid progress. Characters simply inherited may be reasonably easy to transfer but with quantitative characters it is likely that only partial success will be obtained with each cross attempted.

Despite the difficulties to be encountered in wide crosses, failure to achieve the objective is by no means indicated. **Interspecific hybrids** have probably been studied more extensively in *Triticum* than in any other farm crop. As an indication of the possibilities of this type of crossing it must be stated that the variety of common wheat named Thatcher is the result of a species cross (*Triticum durum* X *Triticum vulgare*) and combines to a very high degree the black stem rust resistance found in durum wheats with some rust resistance and the very high milling quality of the common bread wheat type. Originating at the Minnesota Experiment Station this variety promises to supplant to a very great extent the usual varieties grown in the hard red spring wheat of North America.

In the Genus Beta several species crosses have been reported as successful. Cytological studies made on some of the hybrids have given some information in regard to chromosome relationships. There is great need however for continued cytological investigation of species hybrids in order that more information be made available on the basic causes of their sterility.

Recently the discovery of the effects of Colchicine on plant growths has enlarged the field for the synthesizing of artificial species. Species crosses commonly found sterile can now be more easily made fertile true breeding species by treating with colchicine to double the chromosome number. The economic value of the tetraploid and other polyploid Beta types which can be artificially synthesized by this method is unknown.

Investigations into species crosses in Beta and into the production and study of artificially synthesized species is a field of research which should be fruitful not only in studies of inheritance but also in the production of varieties of sugar beets more suitable to our needs.