

varieties do not breed true is based on examination of several batches of nursery-grown seedlings, each batch nominally being of one variety. In every case it was found that there were seedlings obviously of different varieties. The differences are sometimes so marked that certain kinds of seedlings are "weeded" out from the rows of young flax-plants.

Two separate aspects of this failure to breed true need consideration here. First, there can be no doubt that a fairly large proportion of the seedlings resemble the seed parent. It is therefore possible to select from the seedlings plants which resemble the parent. The main objection to this is the great amount of extra expense involved in selecting the right seedlings and in growing the rejected plants until they are old enough to be distinguished.

The second objection is concerned with a loss of hybrid vigour in the plants. A self-pollinated flax-plant produces mixed seedlings because the plant itself is already a hybrid. The seedlings, however, will show the effects of hybrid vigour much less than does the original hybrid. In America, for instance, it has been found that crossing two varieties of plants may give a hybrid with 50 to 100 per cent. more vigour of growth than either parent. The seed from these hybrids, however, grew into plants with about one-half of this hybrid vigour. This loss of vigour appears to be the same as the effect of close "inbreeding" of animals. From this it should be plain why hybrid flax-seedlings are considered best. If seedlings are to be planted they should be as vigorous as possible; in other words, they should be the original hybrids. A single pod or capsule of flax produces about a hundred seeds, and this number of plants would result from a single cross-pollination. About 1,500 seedlings are required to plant 1 acre, so that the task of raising hundreds of acres of seedlings from artificial pollination should be quite possible and profitable.

It is hardly necessary to add that hybrid vigour is a secondary aim in crossing. The combination of desirable qualities is the main object. In the short time at my disposal I have paid some attention to the characters which are most desirable in flax. The most outstanding of these are (1) resistance to disease—especially yellow-leaf; (2) strength of fibre; (3) percentage of fibre; (4) vigour of growth; (5) colour of leaf-butt—white or otherwise; (6) shape of leaf-tip.

Resistance to yellow-leaf is one of the most important problems. So little is known about the disease that only careful examination of affected areas can show what varieties, if any, are immune.

Strength of fibre is a matter which needs a great deal of attention. Flax-fibre sells for its strength, and failure to maintain a good standard in this respect will create a prejudice against the fibre which would be very difficult to overcome. There are varieties of flax which produce fibre stronger than manilla, and there is no reason why, in time, our fibre should not approach that standard. Strength is estimated at present by breaking in the hand. Strength of fibre no doubt varies from plant to plant, from leaf to leaf, from one part of the leaf to another, and even from fibre to fibre in one part of the leaf. There is great need here for accurate strength tests made by suitable machines so that results can be given in actual figures.