

IMPROVEMENT OF PHORMIUM TENAX.

RESEARCH ON BREEDING AND CULTIVATION OF THE PLANT.

DURING the past few months Dr. J. S. Yeates, of Wellington, has been conducting an investigation into the improvement of *Phormium tenax* (New Zealand flax) under the auspices of the Council of Scientific and Industrial Research. Progress reports by Dr. Yeates, dated 5th and 12th December respectively, have been made available as under :—

The following is a summary of the work done in the last three months on the cytology and genetics of phormium. It will be recollected that my task was primarily to find the chromosome numbers of phormium species and varieties, with a view to hybridizing. There are two species, and many of the varieties are supposed to be hybrids between these two species. If the chromosome number is not the same in all species and varieties, then hybridizing will lead to irregular results. Such difficulty has been found in crossing some kinds of wheat.

I have made preparations and counted the chromosomes of over thirty varieties of flax, including representatives of both species. The chromosome number in all these is the same—namely, 16—and the behaviour of the chromosomes is regular throughout. From the breeder's point of view this result is extremely satisfactory. It means that cross-fertilization between any two varieties should give normal Mendelian results.

By using a new rapid method the above work was done in a small part of the time ; the remaining time has been spent in studying (1) the courses of the fibre-strands through the leaf ; (2) the differences between varieties, commercial and otherwise ; (3) the question of whether or not the varieties breed true from seed.

The general conclusions are as follows: (a) That it should be possible to cross successfully any two varieties of flax which flower at about the same time. (b) That, in general, varieties do not come true from seed. (c) That in the near future planting will be done chiefly with hybrid seedlings which will be the first generation from crosses between suitable parent varieties. The parent varieties will be selected for resistance to disease, quality of fibre, and yield per acre. The hybrid offspring should grow more vigorously and combine the desirable qualities of two or more natural varieties.

It has already been stated in a preliminary report that the chromosome numbers of flax varieties have been found very favourable for breeding-work. This aspect requires no further mention here.

The brief reference made in the report concerning the failure of flax to come true from seed needs some qualification. It would be presumptuous to say at the present time that no flax breeds true. It is highly probable that pure breeding strains do exist in some isolated localities where cross-pollination is difficult. My view that most