MALE-STERILITY IN FLAX, SUBJECT TO TWO TYPES OF SEGREGATION.

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(With Plate XXVI.)

In 1912 a single plant was noticed in a patch of Linum grandiflorum sown in our border of annuals. It was remarkable as having a blue flower and procumbent habit, whereas L. grandiflorum is deep crimson and erect. In its low stature the new plant somewhat resembles the various kinds of flax cultivated for oil in many countries. Several of these oil-flaxes have in subsequent years been grown here, but we had none in 1912, which was indeed the first year in which any form of L. usitatissimum was sown in this garden. All the flaxes cultivated, whether for fibre or oil, are included under that specific name. The new plant, which we shall here call the “procumbent,” is also evidently a true usitatissimum, though in being procumbent it differs from any variety which we have seen. Obviously it has no connexion with grandiflorum, which is a very distinct species. We have no surmise as to what its origin may have been, but somehow a stray seed from which it arose must have got mixed with the grandiflorum.

Since in 1912 experiments on flax were begun with various objects the appearance of the procumbent was a matter of interest, and its seeds were collected. Whether the flowers had been covered is not recorded. Probably they were, but the point is of little importance, for only a small percentage of crossing occurs in usitatissimum. The procumbent bred true from the first and has continued true in each year since, except that a naturally cross-bred plant appeared once in a row raised from unprotected seed, as may happen with any flax.

The new form differs from any other flaxes that we know in the following respects.

1. It is procumbent during growth, branching much from the base, and the stems reach about 2 ft. in length, lying at first flat on
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the ground, turning upward as flowering begins, and finally standing more or less erect.

2. The style is very pale in colour, and when the petals of an opening flower are pulled off it projects well above the sepals, which are perhaps slightly shorter than those of ordinary flaxes. But like other forms of *usitatissimum* the variety is definitely homostyled, the tops of the anthers just reaching beyond that of the stigma.

3. It is very late in flowering, about 10 days later than any other variety that we have.

In other respects there is nothing special to note. The capsule and seeds are of the ordinary size, not large as those of our oil-flaxes are.

The first crosses were made in 1916 by Miss M. Michell of Cape Town, who fertilised the procumbent with pollen from a tall white-flowered fibre-flax. The object of this cross was to study the genetics of height. Though from the extraordinary uniformity in height characteristic of pure lines of flaxes these plants seem well adapted for such work, the distribution of height in *F₁* is complicated, all intergrades occurring, with indications of segregation so imperfect that useful results could only be obtained by measurements on a very large scale continued through several generations. Much work of this kind has been carried out on which we may publish a report later, but at present it must suffice to say that though segregation in respect of height occurs, and though the parental types, both procumbent and tall, reappear in *F₂*, they are rare, and the height-curves of these families show no obvious dimorphism.

The purpose of the present paper is to give the facts respecting the behaviour of a male-sterile form which appeared in *F₁* in 1918. *F₁* is erect and intermediate in height, and in colour also (as T. Tammes found in crosses between blue and white flaxes, and as we have also often seen in other cases). In *F₂* Miss H. Garlick, who was then in charge of these experiments, observed certain plants, both blue, white and intermediate in colour, which had flowers with reduced petals, as a rule scarcely opening at all. In these flowers the anthers are more or less completely aborted. A row of such plants growing beside a row of normally flowered flaxes is shown on Pl. XXVI, together with photographs of drawings of the normal and of the abnormal flowers in various stages.