

## 2. Heritable proliferation of tassels and vegetative reproduction in Zea mays L.

In 1931 I first reported in "Der Zuchter" the occurrence of a heritable proliferation of tassels in certain plants which were offspring of plants with decussated / opposite positioned leaves. Since that time about one thousand such plants have been studied so that now it is possible to present a short survey of the growth, morphology, and inheritance of the mentioned character. A difference between these and normal plants is detectable as soon as the fourth leaf appears due to the fact that the further growth of the abnormal plants is very slow. In the flowering stage the abnormal plants have a height of 50 to 90 cm. if the tassel, which usually hangs down, is extended. The stalk is about 20 to 40 cm. high and has 4 to 5 nodes. The leaves are about 2 to 3 cm. in width and have a length of from 30 to 50 cm. The largest leaf is at the third node below the tassel. The tassels are about 40 to 60 cm. long and have 28 to 35 nodes. On these nodes are inflorescences of a peculiar form and size. On the base of the tassels are shoots that resemble young maize plants and at the terminal part, very small spikelets are attached. These spikelets lack anthers. Directionally from the top to the base of the tassel there may be found: nearly 50 spikelets (lacking anthers) on a length of about 4 cm., next, approximately 100 spikelets with normal anthers on 5 cm., and then a part of the tassel with more than 100 abnormal spikelets and shoots respectively. In the uppermost shoots, anthers and pistils occur, but near the base of the tassel, the inflorescences in the shoots are often not developed. These shoots have a leaflike organ at the base. This organ has developed from the glume. The next leaves on such shoots show a visible sheath and blade at this stage of development.

Sometimes a scalelike organ occurs between the undifferentiated leaves and those leaves with a differentiated sheath and blade. This scalelike organ has probably developed from the lemmas and paleas. The proliferation of the staminate inflorescence has probably taken place at the time of the formation of the glumes. The glumes have changed into leaves and from the vegetation point a shoot instead of a flower has developed. The second, upper flower has not appeared. The shoots on the lower most nodes have small roots. Such shoots when transplanted to soil, grow into plants of about 120 cm. height, and develop normal tassels. However, these plants usually do not have ears. In some lower shoots of the first mentioned abnormal plants, very small ears are visible. From self-fertilization which normally takes place in such shoots, offspring may be obtained. These offspring are abnormal plants resembling the parental type. Hybridization of normal plants with the proliferating type, through the use of pollen from abnormal plants, results in an  $F_1$  with abnormal plants similar to the defective parent. The abnormal factor is dominant in action. The  $F_2$  consists of abnormal and normal plants in a segregation pattern of nearly 3:1. In spite of crosses with ten maize chromosome testers, data is lacking at this date as to the location of the gene or genes controlling proliferation. In the abnormal plants one abnormally long and one abnormally short chromosome have been found. These chromosomes are probably the product of a reciprocal translocation and are perhaps responsible for the abnormal development of the tassels on the plants described.

A. Tavcar