

seed, obtained from a known reliable source, we cannot hope to have uniform, disease resistant plants; and the only reliable method to get such seed is individual seed selection among the growers.

A fertile cause of the above defects in the tobacco crop is the use of immature seed. Certainly, there is reason for believing that small immature seeds produce variable plants which are more subject to certain diseases, particularly the mosaic disease, than are plants grown from heavy, well matured seed. The increased yields in all classes of crops resulting from the use of large, plump, well matured seed has been demonstrated by experiment time and time again. Why should not the conclusions apply with equal force in the usage of tobacco seed?

Another productive source of variation rests in the common practice among some Ontario growers of obtaining seed from one of the states to the south of us, which differs in soil and climatic conditions. This system may be advantageous if the seed plants grown from this seed have been naturalized and rigid selection practised previous to using their seed for the general crop. Nevertheless, the method is rather hazardous for the average Ontario grower.

However, the important cause of this variability in the tobacco crop of Ontario is cross fertilization. According to the laws of plant breeding, seed originated from cross fertilization produces plants which do not resemble either parent. Where the seed plants have been grown without protection from cross fertilization, a number of flowers will be hybridized by such agencies as bumble bees, honey bees and other small insects. Thus, desirable plants may be crossed with undesirable plants in the same field or possibly from an adjoining field. Even the intermixing of pollen of desirable plants will break up the original type, resulting in undesirable variations, which are probably reversions to unimproved strains of tobacco.

Perhaps the most important field for investigation is that of breeding a strain of tobacco suited to the soil and climatic conditions of Essex county and furnishing the desired characters in the leaf. This line of investigation requires expert attention and cannot be conducted successfully on volunteer experiment stations. Nevertheless, with the hope of developing a particular type suited to the above conditions, a large number of plants were selected on each of the experimental plots in the different sections of the county.

The method of selecting seed plants adopted by the writer was to examine, several days before topping, nearly every plant in a small area of the field and to mark with a tag those plants which approached the ideal, so that they might be easily recognized when the final selections were made. The object of this preliminary choice rested in the certainty that such characters as early maturity and vigour of growth could be recognized more easily in the young plant than later. At a later date, just before the first flowers opened, the final selections were made, when all characters were considered.

The length of the leaves on each plant was measured with the ordinary tape line, one near the bottom, one near the middle and the other near the top of the plant. The uniformity, shape, colour, texture, size of veins and other minor characters were examined. The number of leaves on the plant was counted and the number and size of suckers were noted. In addition, observations were made regarding the uniformity of the leaves on different parts of the plant, the presence of rust, white spots, and especially the mosaic disease, together with the height of the plant and the distance between the leaves. In no case was a plant suffering from mosaic disease selected for seed purposes.

In all, the special characters of some forty plants comprising the different varieties were recorded in the record book; the purpose is to plant the seed in small sections of the seed bed, to follow the transmission of the characters of the parent plant to the progeny and to develop a special well adapted type of tobacco. The plants finally selected were given a number for identification, this number was written on a paper tag attached to the seed head.