

sclerenchyma areas will never be so seriously affected by rust as varieties in which the collenchyma areas are large. When collenchyma areas are small and well separated then the rust pustules can be long but only very narrow. When wheat is ripening the sclerenchyma areas are increased in proportion, so that a ripening wheat is less damaged by rust than one which is attacked in an earlier stage of growth. Early maturing varieties are therefore more likely to escape destruction by rust than long maturing varieties. Varieties which combine early maturity with small and well separated collenchyma bundles, and with stomata which open only infrequently and for a short time, and whose cell walls are hard, can be described as being morphologically resistant to all biologic forms of rust. Too much reliance must not, however, be placed on such resistance as it can be upset by environmental factors and in a good rust year such varieties might be very seriously affected by rust though not so completely destroyed as morphologically susceptible varieties. The best form of resistance is physiological. Morphological resistance is a very dangerous trap for the unwary Plant Breeder. Owing to the possession of different kinds of this form of resistance some varieties escape severe infection by rust for many years. In fact it is only seldom and usually when they are on the point of ripening that any quantity of rust pustules appear on them. Great care must be exercised in looking for and examining the types of rust pustules in order to determine the real resistance of the variety. If a variety is pure and only one plant in the field shows susceptible forms of rust pustules, then the whole variety must be classed as susceptible. Whatever the reaction varieties of wheat may give to inoculation with rust in the laboratory the real practical test of rust resistance is what happens in the field, but it requires a practised eye to tell exactly what is happening.

It is likely that one of the reasons why the resistance of a variety is commonly supposed to break down after a few years is that it never was more than morphologically resistant, but had not been properly examined, and a good rust year overcame it. Another reason is that the district in which the variety was growing was invaded for the first time by a biologic form of rust which had not so far existed there and to which that variety was not resistant.

All the biologic forms of each species of rust do not necessarily exist in one country, and those which exist say in India are not necessarily the same as those which exist in Kenya Colony. It is obvious, therefore, that wheats which are resistant to rust in any one country are not necessarily so in any other country, and wheats which are resistant to any one species of rust in one district of this country may not be so in any other district. In fact out of the many hundreds of supposedly resistant varieties imported into this country only two or three have proved immune to one or other of the rusts.

The problem of breeding wheats resistant to rust in a Colony with such varied climates as Kenya Colony is no easy one. Wheat has only been grown here a few years so that natural selection has not played its part in separating out resistant types. Further, in no other country is wheat more completely destroyed by rust.

In the light of the experience gained during the past few years of the occurrence of rust, Kenya may be divided into three main classes of districts, and the basis of this division is one of altitude.