

currant bushes claimed \$200 for compensation for something of about \$4.00 value. People who are truly interested in the welfare of their country will eradicate their barberries voluntarily, others will do so under pressure.

To continue, in addition, many other varieties that have been tested for resistance for several years, were seeded in rows at the same stations as the new varieties. The results were the same as in previous years. The Durums, Iumillo, Acme, Monad, and Pentad showed marked resistance to grain rust. Kota was the only one of the bread wheats that showed promising resistance. While a considerable amount of rust develops on it, especially if it is allowed to remain uncut after maturity, yet the attack is always so late that practically no injury is done to the grain.

Iumillo has proved practically immune to stem rust under greenhouse and field tests for a number of years. This lends support to the view that the crosses of Marquis and Iumillo—already referred to—will continue to prove resistant.

A considerable time is spent on the determination of the races of black stem rust (biological strains) present in Canada. The discovery of such strains is the most important addition to our knowledge made during the past ten years; briefly stated, it has been found that some varieties of wheat are susceptible to almost every strain of rust so far known, while others are decidedly resistant, and others again positively immune towards certain strains. Obviously, a wheat only susceptible to a few strains will prove a valuable asset in many districts. Moreover, if such a variety of wheat were grown in a locality where the strains to which it is susceptible do not exist, we would have a wheat worth while growing, with comparative safety and assurance of crop. Along with the actual determination of strains, there are carried on investigations relating to the geographical distribution of the same. The differences in the reaction of wheat varieties to these biologic forms appear to be entirely physiological. The strains themselves are indistinguishable, even under microscopic examination.

This is one of the most promising lines of research, based exclusively upon fundamental scientific principles and, if carefully carried on, precludes many costly errors and much waste of time and effort. It is also *the* phase of work demanding the very closest co-operation of experienced plant breeders with our service. To be successful—unless such breeder already possesses the requisite knowledge—it will be essential for him to be working under the closest guidance and direction of men who are thoroughly conversant with the points upon which rust resistance rests; otherwise, unless such co-operation is reciprocative in effect, new varieties that may exhibit most desirable improvements over varieties now known, may succumb at once when subjected to the immunity tests already outlined.

PHYSIOLOGICAL VARIETIES OR STRAINS OF RUST ON WHEAT

Work on the physiological varieties or strains of stem rust on wheat was continued in the greenhouse in 1923. In determining the strains, use was made of the keys and the differential wheat hosts that are listed by Stakman and Levine in Technical Bulletin No. 8, Minnesota Agricultural College. Determinations of the collections of wheat rust made in 1922, were completed.

Strain No. XVII is usually the most prevalent and the most widely distributed in Western Canada. XXI was most common in 1922. Strain IX was prevalent in 1919, causing Emmer to rust heavily. Since then it has only been collected occasionally and correspondingly Emmer, in the field has been practically free from rust. Strain III was quite prevalent in 1922 and 1923. The prevalence of this strain is noteworthy as it readily attacks Kanred, and probably was responsible for the severe attacks on the Marquis x Kanred crosses in 1923. As far as tested, the strain present on these crosses was Strain III. (vide Table 1.)