

Comments and Communications

Replanting "Discarded" Varieties as a Means of Disease Control

Many soil pathogens accumulate to a high degree in the presence of crops toward which they are virulent. The efficacy of crop rotation as a disease control measure lies in the fact that, in the absence of these crops (i.e., in the presence of nonsusceptible crops), the population of a given pathogen materially decreases. Other pathogens, those to which the alternate crop or crops are susceptible, must as surely increase; but by rotating crops subject to widely different pathogens, effective control is often achieved. Why not then, apply the same general practice in control of such pathogens as the grain rusts, *Helminthosporium* of oats, etc.? Such a practice would involve a rotation of host varieties, rather than of distinct, often widely divergent, crop species.

Development of varieties of crop plants resistant to infectious parasites and insect pests is a significant approach to control of plant diseases. There is now widespread recognition on the part of pathologists, breeders, and practical growers that, contrary to earlier opinion, a new variety represents but a temporary advantage.

"The case of Ceres wheat . . . illustrates this point. This rust-resistant variety was distributed in 1926, and by 1934 was grown on more than four million acres. Race 56 of *P. graminis tritici* was first identified in 1928; in 1930 it comprised only 0.2 percent of the wheat stem-rust population . . . increased to 1.0 percent of the population in 1931, to 2.1 percent in 1932, 3.7 percent in 1933, then increased rapidly to make up 33 percent of the population in 1934 and 66 percent in 1938. Ceres was very susceptible to this race, and in the severe stem-rust epidemics of 1935 and 1937, in which race 56 predominated, Ceres was so heavily damaged that it ceased to be generally cultivated." (CHRISTENSEN, C. M. *et al.* *Ann. Rev. Microbiol.*, 1948, 1, 61.)

Again, recent experience with a group of new oat varieties is significant. These varieties, deriving a highly valued resistance to virtually all races of crown rust from the variety Victoria were planted in this country about 1942. Very soon, reports of a new *Helminthosporium* disease appeared. Now widely recognized under the name *H. victoriae*, this pathogen has eliminated all Victoria derivatives from general use.

While focusing our attention on the striking and often disturbingly rapid increase in "new" races or species of pathogens in the presence of newly emphasized host varieties, we should not forget that some, at least, of the "old" races are correspondingly decreasing. There is likely as significant a decrease in the inoculum of hitherto prevalent pathogens as there is increase in hitherto rare ones! This, coupled with the very possible fact that the

old host varieties well may be resistant to the new pathogens, leads to our main thesis: that varietal rotation should be studied as a means of disease control.

The simple fact that a pathogen is new stands as direct evidence that the older varieties were highly resistant to it, and that it was therefore formerly rare. After five or ten years of widespread plantings of a new host type, it may well be that formerly well-known species or races of pathogens will have become scarce, and that older host varieties can be replanted with profit. That many of these discarded varieties are highly desirable is clearly shown by Quisenberry's statement regarding Vicland oats: "It has been stated that in Wisconsin the years 1942 and 1945 were quite similar so far as climatic conditions for oat production were concerned. In 1942 the average yield in the state was 43.0 bushels per acre when only 90,000 acres of Vicland were grown. By 1945 Vicland had increased to nearly 3 million acres and the state average was 51.0 bushels per acre." (QUISENBERRY, K. S. *Chron. Bot.*, 1948, 11, 237.) By selecting for a given crop, such as wheat or oats, several commercially desirable varieties of widely differing susceptibility, it should be possible to work out a type of rotation which would hold disease losses at a low level.

Rotations involving varieties of the same host species will require great care. Yet the principles governing the biological equilibrium between host and pathogen are the same; and such a program seems hardly as difficult as the present constant search for ever new host varieties. And as McCall points out, "a change in variety requires no change in farm organization, management, utilization, or general plan of financing." (MCALL, M. A. *Chron. Bot.*, 1948, 11, 273.)

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Age of Canada's Principal Gold-producing Belt¹

The east-west trending belt of infolded rocks that extends across Ontario into Quebec and includes many of Canada's largest gold mines has long been known to be very old in terms of earth history. The belt is a trough-like strip of volcanic and sedimentary rocks of so-called Keewatin and Temiskaming age. It probably represents the roots of an ancient mountain belt that seems, by crosscutting relationships, to be older than all other similar zones in the Canadian shield area (WILSON, J. TUZO. *Trans. Amer. geophys. Union*, 29, 691).

In southeastern Manitoba there is an area in which granitic rocks have invaded similar volcanics and sediments known locally as the Rice Lake series. These granites have been established by both Pb/U and Sr/Rb measurements (HOLMES, ARTHUR. *Rep. Comm. Meas. of Geol. Time*, National Research Council 1946-47, p. 39; and AHREN', L. H. *Nature*, Lond., 1947, 180, 874, to be about 2,000 million years old, the greatest age measured heretofore. This area lies on the line of the above-mentioned east-west belt if extended westward.

¹ Supported by the Office of Naval Research, in the laboratory established by the Geological Society of America.