DISCUSSION

VARIETIES OF TRITICUM VULGARE PRACTICALLY IMMUNE IN ALL STAGES OF GROWTH TO STEM RUST[1]

IN searching for wheats of value for breeding purposes one of the aims has been to secure a variety of *Triticum vulgare* with immunity at all stages of growth to all physiologic races of *Puccinia graminis Tritici*. Of the various varieties tested at the Dominion Rust Research Laboratory, at Winnipeg, six appear to meet these requirements.

Five of the wheats in question were received in 1934, from the Department of Agriculture at Nairobi, Kenya Colony, under the identifying numbers 122.D.I.T.(L), 117.E.16.B.1, 117.B.5.B.2, 117.K.16.A.(L) and 117.1.5.-F.(L). They were developed by Burton and his associates and have been described by Burton[2] as being rust-resistant. Macindoe[3,4] tested a number of Kenya wheats, and found the best of these to be either entirely immune or very resistant to stem rust under epidemic conditions in Australia.

The sixth variety was received, in 1935, from Mr. M. S. J. McMurachy, a farmer near Strathclair, Manitoba, Canada. Mr. McMurachy had discovered it about the year 1930 as a single rust-free plant in a field of Garnet wheat. He increased it, and when he found that it withstood the rust epidemic of 1935 he brought it to the attention of the staff of the Dominion Rust Research Laboratory. This variety is now known as McMurachy's Selection.

Every year, since these wheats were received, they have been subjected, at Winnipeg, to an artificially-induced epidemic of stem rust in which approximately 30 physiologic races collected in various parts of Canada were used as inoculum. In addition the plants were, of course, also exposed to any natural rust infestation that occurred. Apart from an occasional trace of rust, which will be discussed below, the six wheats in question appeared to be immune to all races occurring in the field.

The same varieties were tested in the seedling stage in the greenhouse with the following twenty physiologic races of stem rust: 9, 10, 11, 15, 17, 19, 21, 29, 32, 34, 36, 38, 39, 48, 50, 56, 113, 120, 139 and 162. The seedlings of all six varieties reacted alike. Except at abnormally high temperature where resistance was found to break down, no rust pustules were produced by any of the twenty above-mentioned races, but minute flecks scarcely visible to the naked eye were occasionally observed. In this connection it may be mentioned that according to Macindoe[3] some of the Kenya wheats have been found by Waterhouse to possess resistance in the seedling stage to the prevalent Australian races of stem rust.

It has been found that plants of the Kenya wheats and of McMurachy's Selection may be infected with stem rust by injecting urediospores within the leaf sheath where they come into contact with and infect the immature and as yet unexposed parts of the stem. As the stem grows the infected part emerges from the leaf sheath and the rust pustules become visible. Such infections may, however, be produced on most wheat varieties that show immunity under field conditions, and have even been produced on certain oat varieties injected with wheat stem rust, an organism to which they are immune in the field.[5] The rare stem-rust pustules that have been observed on plants of the Kenya wheats and McMurachy's Selection in the field have almost invariably been situated on the stem just above the leaf sheath, which suggests that they are due to spores falling within the leaf sheath and causing internal infections.

From the results obtained in the various rust tests there seems to be good reason to believe that the six wheat varieties in question are practically immune at all stages of growth to all physiologic races of stem rust occurring in Canada.

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[2] G. J. L. Burton, Ann. Rept. Dept. of Agric. Kenya for the year ended December 31, 1931. Pp. 176–201, 1932.

[3] S. L. Macindoe, *Agr. Gaz. N. S. W.* 42: 475–484, 1931.

[4] Ibid., *Jour. Austral. Inst. Agric. Sci.*, 3: 25–31, 1937.

[5] Margaret Newton and A. M. Brown, *Can. Jour. Research*, 11: 564–581, 1934.

FRESH-WATER JELLYFISH IN HAWAII

THE wide distribution of fresh-water jellyfish in the United States was emphasized by the report of Dr. Waldo L. Schmitt[1] early this year. Locality records now include at least twenty states in addition to the Canal Zone. More recently H. Z. Gaw and L. H. Kung[2] announced the finding of fresh-water jellyfish in Kiating, Szechuen, China.

The islands of the Central Pacific area should now be included in the range of fresh-water coelenterates by reason of their discovery on the island of Maui. As reported by Miss Miriam Sylvester, of Hamakuapoko, Maui, medusae were first observed during November, 1938, in a pond in Maliko Gulch, about eight

[1] *The American Naturalist*, 73: 83–89, January–February, 1939.

[2] SCIENCE, 90: 299, September 29, 1939.