DISEASE RESISTANCE OF *TRITICUM TIMOPHEEVI* TRANSFERRED TO COMMON WINTER WHEAT

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*TRITICUM timopheevi* Zhuk. is a species native to southern Russia and was introduced into this country by the U. S. Dept. of Agriculture in 1930. It is an unusual wheat because of its resistance to a number of diseases and because species crosses with it are highly sterile. It has proved highly resistant to leaf rust and stem rust under field conditions for the past 9 years at Madison, Wis. Several tests during this period indicate that it is resistant to bunt and mildew. It offers a new source of disease resistance which should be very valuable to the plant breeder if transferred to the common wheats. Rust resistance factors from other 14-chromosome wheats have been valuable in recently produced varieties of common wheat. Iumillo durum was the source of rust resistance in Thatcher and Yaroslav emmer for that in Hope which, in turn, has been used extensively in breeding new varieties. Investigations of Kihara and Lilienfeld and of Kostoff have shown that hybrids between *T. timopheevi* and other *Triticum* species are highly self-sterile regardless of chromosome number of the species used. From the cross *T. vulgare* Vill. variety Steinwedel × *T. timopheevi*, Pridham obtained lines that were resistant to stem rust and leaf rust and *T. vulgare* in type.

This paper briefly gives the history of a hybrid, its fertile progeny, and a few preliminary karyological observations. Crosses were made between *Triticum timopheevi* and a number of varieties of *T. vulgare*, the haploid chromosome numbers being 14 and 21, respectively. Difficulty was experienced in obtaining germinable hybrid seed when *T. timopheevi* was used as the female. The kernels developed to a normal size at the milk stage, but at maturity they were very shrivelled and most of them failed to germinate. There was no difficulty, however, in obtaining seed when *T. vulgare* was used as the female. The hybrid caryopes were smaller than normal for the female parent but were relatively plump with a visible and viable embryo. The first generation plants were highly self-sterile in all crosses. Thus, approximately 6,600 selfed flowers from *F₁* plants of all crosses have produced only 23 kernels, or 0.348% fertility. The anthers dehisced poorly and the iodine test showed about 95% of the pollen grains apparently sterile. Emasculating the *F₁* plants and pollinating with *T. vulgare*...