Segregation for Stem Solidness in a *Triticum Aestivum* × *T. Durum* Wheat Cross

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STEM solidness has been known for many years as an important plant character in reducing damage by the wheat stem sawfly, *Cephus cinctus* Nort. (1). It is also known that the sawfly resistance of solid-stemmed wheats can be modified by environment (5, 8).

Golden Ball (*Triticum durum* Desf.) has a more solid stem than varieties of common wheat (*T. aestivum* L. emend. Thell.), particularly in the top internode. The stem solidness of Golden Ball might be useful as an additional source of sawfly resistance if it could be transferred to hexaploid wheats.

Platt and Larson (9) and Larson (2) were unable to transfer the complete stem solidness of Golden Ball to *T. aestivum*. They attributed their failure to gene O in the D genome which, according to Yamashita (10), is epistatic to genes for stem solidness at other loci. Monosomic analysis by Larson and MacDonald (4) tends to confirm the presence of gene O and indicates that it is located on chromosome XX.

On the basis of early work by Yamashita (10) and Platt and Larson (9) it seemed logical that Rescue (*T. aestivum*) did not carry factors epistatic to stem solidness in its D genome, since Rescue itself has a solid stem. Using this hypothesis, Golden Ball was crossed to hollow-stemmed, sawfly-susceptible plants from the cross of Rescue × N1315 (2).

The assumption was made that the epistatic factor would segregate and some hollow-stemmed selections from Rescue × N1315 would be obtained which did not carry this factor. Also, by having a hollow-stemmed *aestivum* parent it would be obvious that any stem solidness in the offspring was coming from Golden Ball.

**MATERIALS AND METHODS**

Plants of Rescue × N1315 which were apparently hollow-stemmed were crossed to solid-stemmed plants of Golden Ball in the field at Bozeman, Montana, during the summer of 1949. In each of 40 crosses a different plant of each parent was used. Rescue × N1315 was the female parent in each cross.

Seed was harvested from only 33 of the 40 crosses, either because no seed formed or the female plant showed stem solidity at harvest. Seed of the parent plants was saved from each cross.

Parent and crossed seed from the 33 crosses were space-planted in the field at Bozeman in 1950. Plants were pulled at harvest and examined for stem solidity. Seed was saved from only 13 crosses, either because no seed set (in 8 crosses) or because the female parent was solid or partially solid.

After 1950, the segregating progenies were handled on a plant-to-row basis. Plantings were made at Choteau, Montana, where plants were saved on the basis of sawfly resistance. When sufficient seed was available duplicate plantings were made at Bozeman, and...