Inheritance of Panicle Type, Height, and Straw Strength of Derivatives of Scotland Club Oats.¹
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SCOTLAND Club spring oat (C.I. 7518),³ Avena sativa L., is a short type with stiff straw and a dense panicle. Murphy et al. (6) reported this variety best in straw strength of 100 studied in detail after selection from a preliminary test of 5,471 strains in the World Oat Collection of the U. S. Department of Agriculture. Scotland Club resembles Trelle dwarf, a mutant from the Victory variety, in appearance and in segregation of dwarf, intermediate, and normal panicle types in a 1:2:1 ratio as described by Derick (1) for Trelle dwarf. Derick and Love (2) in cytological studies of genetic populations involving Trelle dwarf found the dwarf, intermediate, and normal segregants all had 21 chromosome pairs. The presence of a terminally attached chromosome pair in the dwarf but not in the normal forms suggested a deficiency or translocation of a chromosome arm. The presence in the intermediate (F₁) type of two associated pairs of chromosomes of different lengths favored the translocation hypothesis. Hamilton (3) reported detailed measurements of nodes, culm wall thickness, and other straw characters for Trelle dwarf. It was not determined whether Scotland Club and Trelle dwarf involved the same character since crosses were not obtained by the present authors. The florets of these types were subject to severe mechanical damage on emasculation, and no seed was set.

These genetic studies are part of a program to evaluate the usefulness of the Scotland Club type in breeding improved varieties.

MATERIALS AND METHODS

Scotland Club has a compact panicle (Figure 1) with twisted weak pedicels which often drop spikelets. The lower outer-glume (frequently called simply “glume”) is generally lacking, and the first floret of the spikelet usually does not set seed. Since this variety is poorly adapted and nonproductive in Indiana, studies of the type were based on derivatives from crosses with adapted varieties. The Fi type from crosses of Scotland Club with adapted varieties were intermediate in height and panicle density and desirable in agronomic type (Figure 1).

Inheritance of height and compact panicle and the association of these with the fatuoid character and with the monogenic (5) Landhafer resistance (LL) to crown rust were studied. The genetic studies were conducted in the field. Races 202 and 216 of Puccinia coronata (Pers.) Cda. were established in disease-spreader rows in the nursery to obtain crown rust reactions.

Segregation for height was studied in 5 families of Purdue hybrid 5512 which has the parentage: (C.I. 5962)³ × (Clintland³ × Scotland Club). C.I. 5962 is a selection made by R. A. Derick, Canada Department of Agriculture, from the cross (Roxton × Victoria-Hajira-Banner) × (Ajax × Victoria-Hajira-Banner). Clintland (C.I. 6701) was developed by the authors from the third

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