Registration of Parental Lines

REGISTRATION OF M (Midseason) SERIES OF ISOLINES OF OATS AS PARENTAL LINES

K. J. Frey and J. A. Browning

X104C-7 (Reg. No. PL 1), X270I (Reg. No. PL 2), X421I (Reg. No. PL 3), X422 (Reg. No. PL 4), X423 (Reg. No. PL 5), X424II (Reg. No. PL 6), X447 (Reg. No. PL 7), X449I (Reg. No. PL 8), X475I (Reg. No. PL 9), and X765 (Reg. No. PL 10) isolines of oats (Avena sativa L.) were developed by the Iowa Agriculture and Home Economics Experiment Station in cooperation with the Agricultural Research Service, U.S. Department of Agriculture. The M (midseason) isolines of oats were developed by backcrossing different genes that confer resistance to the crown-rust fungus (Puccinia coronata Cda. var. avenae Fraser and Led.) into the genetic background of a common recurrent parent.

The recurrent parent used to develop the M isolines of oats was C.I. 7555, a line selected from the cross 'Clintland' 5 × 'Victoria' 2 × 'Hajira' × 'Banner' 3 × 'Victory' × Hajira 4 × 'Roxton'. The crosses from which C.I. 7555 was developed were made from 1953 to 1957. From 1957 through 1959, C.I. 7555 was purified and tested for disease reaction and agronomic performance. It carries the Pg 2 (A) and Pg 4 (B) genes that confer resistance to certain races of the oat stem-rust fungus (Puccinia graminis Pers. avnae Eriks. and E. Henn.) and also carries the Pc 5 gene that confers resistance to certain races of the crown-rust fungus. Beginning in 1959, C.I. 7555 was used as a recurrent parent in a series of backcrosses with other oat lines that possessed unique and useful genes for crown-rust resistance. The M isolines developed from these backcrosses and their pedigrees are listed in Table 1. Each isoline was formed by compositing seed from all F_2 progeny rows from the last backcross that were homogeneous for crown-rust resistance and that conformed to the recurrent parent in plant type.

The M series isolines are midseason in maturity and medium in height, and produce predominantly medium-sized yellow seeds. All have semi-compact panicles and medium lodging resistance. Plants of these lines produce short, upright, dark green leaves. Frey and Browning (1971) reported that several of the M isolines, even though they have similar appearances, have yield patterns different from that of the recurrent parent. In 12 rust-free experiments conducted in Iowa during 1966-68, X270I yielded 4.6% more grain than C.I. 7555. Also, its test weight was 0.6 kg/ha less. X423 produced 2.5% more grain than C.I. 7555. The regression stability index for C.I. 7555 was 0.90, which was not significantly different from unity. X423 and X447, however, had stability indexes significantly above, and X104C-7, X421I, and X424II had values significantly below 1.0 (Frey, 1972).

Four M series isolines, X270I, X421I, X475I, and X765, have resistances to the crown-rust fungus that were derived from lines of Avena sterilis L. Isolines X447 and X449I have genes that confer adult-plant resistance. In the seedling stage, plants of these two lines appear completely susceptible to the crown-rust fungus. Field reactions of all isolines in the M series to three key races of crown rust obtained from single plants have been reported by Frey, Browning, and Grindeland (1971a). All M series isolines of oats listed in Table 1 carry Pg 2 and Pg 4 genes for resistance to the stem-rust fungus. They are multilines (Browning and Frey, 1969; Frey, 1972). All M series isolines carry the Pg 2 (A) and Pg 4 (B) genes for resistance to the stem rust fungus. Field reactions of all isolines in the M series to three key races of crown rust obtained from single plants have been reported by Frey, Browning, and Grindeland (1971a).

The M series isolines of oats were used to produce cultivars 'Multiline M68', 'Multiline M69', and 'Multiline M70' (Frey et al., 1971a and 1971b). Breeder seed of the M isolines of oats in the M series will be maintained by the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa 50010.

REFERENCES


REGISTRATION OF E (Early) SERIES OF ISOLINES OF OATS AS PARENTAL LINES

K. J. Frey and J. A. Browning

X292II (Reg. No. PL 11), X434II (Reg. No. PL 12), X468II (Reg. No. PL 13), X466II (Reg. No. PL 14), X470I (Reg. No. PL 15), X470II (Reg. No. PL 16), X469II (Reg. No. PL 17), X539II (Reg. No. PL 18), X539III (Reg. No. PL 19), X719 (Reg. No. PL 20), X719 (Reg. No. PL 21), X719 (Reg. No. PL 22), and X766 (Reg. No. PL 23) isolines of oats were developed by the Iowa Agriculture and Home Economics Experiment Station in cooperation with the Agricultural Research Service, U.S. Department of Agriculture. Breeder seed of the E isolines of oats were developed by backcrossing different genes that confer resistance to the crown-rust fungus (Puccinia coronata Cda. var. avenae Fraser and Led.) into the genetic background of a common recurrent parent.

The recurrent parent used to develop the E isolines of oats was C.I. 8044 which is a pure line selected from 'Clintland' × 'Garry-5' made in 1954. The F_1 hybrid was grown at Aberdeen, Idaho, and Ames, Iowa. From a planting of F_1 panicule rows grown at Ames, Iowa, one which appeared especially promising, C237-89 (C.I. 7970), was singled out for intensive testing. A large number of C237-89 F_2 and F_3 progeny rows were grown at Aberdeen, Idaho, and Ames, Iowa, respectively.

Table 1. Isolines of oats in the M series and their pedigrees.

<table>
<thead>
<tr>
<th>Isoline</th>
<th>CI no.</th>
<th>Parentage</th>
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<tbody>
<tr>
<td>X104C-7</td>
<td>9182</td>
<td>CI 7555 × Cultch du Bouch</td>
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