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**Short Communication**

# Breeding behaviour of monosomics of two hexaploid wheats over 20 years

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Nearly 40 years back, all the 21 monosomic lines of variety Chinese Spring were kindly made available by E.R. Sears [1]. Since then these aneuploid lines have been used for transferring monosomic series in cv Pb. C591, developing substitution lines of cv. Pb. C591 in the genetic background of cv Chinese Spring, locating genes on specific chromosome and chromosome arms and transferring desirable genes from *Secale cereale* to hexaploid wheat using aneuploid line for chromosome 5B [2-9].

All the monosomic lines of cv Chinese Spring (obtained from E. R. Sears) and cv Pb. C591 [2] are being maintained and used for cytogenetical studies, at the Division of Genetics, Indian Agricultural Research Institute, New Delhi. Breeding behaviour of monosomic lines of cv Chinese Spring was studied for 23 years (Table 1) and breeding behaviour of cv. Pb. C591 was studied for 21 years (Table 2). Each year monosomic lines were identified cytologically at first meiotic metaphase in both the cultivars. Data related to cv Chinese Spring revealed that out of the 779 plants analysed, 64.4% were monosomics (20"+1'), 34.4% disomics (21"), 0.6% double monosomics (19"+2') and 0.5% were nullisomics (20") and trisomics (21"+1'), (Table 1). Similarly in cv Pb. C591, 665 plants were analysed, out of these 70.5% were monosomics, 28.4% disomics, 0.4%, double monosomics and 0.6% nullisomics and trisomics. The frequencies of monosomics and disomics in the selfed progeneies of monosomic lines in these varieties were well within the range (49 to 85% of monosomics and 11 to 29% of disomics) reported earlier [10]. Low frequencies of nullisomics and trisomics obtained in the monosomic lines of the two cultivars could be due to the fact that only those plants which flowered first were used for monosomic analysis, expecting that identified monosomic plants could be effectively utilised in crossings and for maintenance of monosomic lines.

Person [11] reported double monosomics with a low frequency (0.4%) in population of 225 monosomic plants. A similar frequency of double monosomics was obtained by McGinnis and Campbell [12]. The frequency reported in the present communication is similar to that reported by these workers. However, Joshi et al. [3] reported a very high frequency of double monosomics (1.9%) in the selfed progenies of Chinese Spring monosomic lines. Since the presence of double monosomics and trisomics may permit univalent shift, therefore, a rigid cytological identification of monosomic plants required for crossing programme and maintenance, is only necessary. It will allow to maintain purity of monosomics.

**Table 1.** Chromosome constitution in the selfed progenies of Chinese Spring monosomics

| Year | Total plants analysed | Disomic | Mono-somic | Double Mono-somic | Nullisomic and Trisomic |
|---|---|---|---|---|---|
| 1970 | 70 | 30(42.9) | 39(55.7) | 1(1.4) | - |
| 1971 | 9 | 5(55.5) | 4(44.5) | - | - |
| 1972 | 37 | 13(35.1) | 24(64.9) | - | - |
| 1973 | 52 | 23(44.2) | 28(53.8) | - | 1(1.9) |
| 1974 | 24 | 7(29.2) | 17(70.8) | - | - |
| 1978 | 2 (only 5B) | 1(50.0) | 1(50.0) | - | - |
| 1979 | 39 | 10(25.6) | 28(71.8) | - | 1(2.6) |
| 1980 | 38 | 11(28.9) | 27(71.0) | - | - |
| 1981 | 37 | 12(31.6) | 24(63.2) | - | 1(2.7) |
| 1982 | 43 | 18(41.9) | 24(55.8) | 1(2.3) | - |
| 1983 | 38 | 12(31.6) | 26(68.4) | - | - |
| 1985 | 39 | 15(38.5) | 24(61.5) | - | - |
| 1986 | 33 | 13(39.4) | 20(60.6) | - | - |
| 1987 | 24 | 6(25.0) | 18(75.0) | - | - |
| 1989 | 33 | 8(24.2) | 25(75.8) | - | - |
| 1990 | 3 (only 5B) | 1(33.3) | 2(66.7) | - | - |
| 1991 | 54 | 26(48.1) | 28(51.9) | - | - |
| 1993 | 42 | 15(35.7) | 26(61.9) | 1(2.3) | - |
| 1994 | 19 | 9(47.4) | 10(52.6) | - | - |
| 1995 | 29 | 7(27.6) | 21(72.4) | - | - |
| 1996 | 31 | 10(32.3) | 21(67.7) | - | - |
| 1998 | 32 | 7(21.8) | 24(75.0) | 1(3.2) | - |
| 2000 | 31 | 9(29.0) | 21(67.7) | 1(3.2) | - |
| Total | 779 | 268 | 502 | 5 | 4 |
| Percentage | | 34.4 | 64.4 | 0.6 | 0.6 |

*Figures in parenthesis indicate percentage

**Table 2.** Chromosome constitution in the selfed progenies of monosomics of Var. Pb. C591

| Year | Total plants analysed | Disomic | Mono-somic | Double mono-somic | Nullisomic and trisomic |
|---|---|---|---|---|---|
| 1970 | 35 | 6(17.1) | 29(82.9) | - | - |
| 1971 | 27 | 7(25.9) | 20(74.1) | - | - |
| 1972 | 28 | 7(25.0) | 21(75.0) | - | - |
| 1973 | 40 | 14(35.0) | 25(62.5) | - | 1(2.5) |
| 1974 | 9 | 3(33.3) | 6(66.6) | - | - |
| 1978 | 30 | 8(26.6) | 20(66.7) | 1(3.3) | 1(3.3) |
| 1979 | 31 | 8(25.8) | 23(74.2) | - | - |
| 1980 | 91 | 37(40.7) | 53(58.2) | - | 1(1.1) |
| 1981 | 33 | 7(21.2) | 26(78.8) | - | - |
| 1982 | 27 | 7(25.9) | 20(74.1) | - | - |
| 1983 | 32 | 10(31.3) | 21(65.6) | 1(3.1) | - |
| 1985 | 38 | 14(36.8) | 24(63.2) | - | - |
| 1986 | 5 (only 5B and 3A) | - | 5(100.0) | - | - |
| 1987 | 30 | 7(23.3) | 23(76.6) | - | - |
| 1989 | 43 | 17(39.5) | 25(58.2) | 1(2.3) | - |
| 1990 | 7 (only 3A) | - | 7(100.0) | - | - |
| 1991 | 34 | 6(17.6) | 28(82.4) | - | - |
| 1993 | 33 | 10(30.3) | 23(69.7) | - | - |
| 1994 | 32 | 6(21.9) | 25(78.1) | - | - |
| 1998 | 28 | 6(21.4) | 22(78.6) | - | - |
| 2000 | 32 | 9(28.1) | 23(71.9) | - | - |
| Total | 665 | 189 | 469 | 3 | 4 |
| Percentage | | 28.4 | 70.5 | 0.4 | 0.6 |

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