diploid level. Although with allotetraploidy fertility is generally restored[6], this plant is completely sterile and thus presents a case of genic sterility[7]. The diploid hybrid has been studied cytologically[8] and a cytological account of the allotetraploid has been completed.

I am grateful to Prof. K. B. Deshpande. for facilities and to Dr. P. E. Brandham, Jodrell Laboratory, Kew, for advice.

Department of Botany, A. B. SAPRE.
Marathwada University,
Aurangabad 431 002, *January* 15, 1976.

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HYBRIDIZATION BETWEEN *AMARANTHUS GRAECIZANS* AND *A. VIRIDIS*

BOTH the parental species are wild and belong to the section Blitopsis of the genus *Amaranthus*. While *A. viridis* L. is a worldwide weed, *A. graecizans* L. occurs in cultivated fields and appears to have been naturalised from tropical America[2]. Their tender tips are often used as pot herb, although these are not valued as much as those from *A. tricolor* L. and *A. lividus* L. A number of naturally occurring interspecific hybrids have been reported from this section[1], but only some have been cytologically investigated[3-4]. However, the present hybrid has been investigated for the first time and some interesting morphological and cytological facts are being reported here.

Seeds of *A. graecizans* were collected from Coimbatore and those of *A. viridis* from Lucknow. The particular form of the latter taxon used in this study conformed to the description of the typical *A. viridis* in the taxonomically important features of perianth and utricle, but differed slightly in colour and leaf shape. These differences fall within the overall range of the species and its taxonomic identity was confirmed by the authorities at Kew.

The two species do not seem to be very compatible. Hybrids were raised after removing young unopened male flowers from each glomerule of *A. graecizans*, followed by heavy dusting with *A. viridis* pollen. Even so, more than half of the progeny comprised of the maternal parent resulting from the self-pollination due to subsequent emergence of male flowers in the glomerule, which could not be removed without damaging the whole glomerule. Cytological studies were carried out from the pollen mother cells for which the young inflorescences were fixed in Carnoy's fluid to which a few drops of 45% acetic acid saturated with iron acetate had been added. After 48 hours the buds were squashed in 1% acetocarmine.

Morphologically, the hybrid was intermediate in branching pattern, leaf shape and colour with an overall dominance of the female parent (*A. graecizans*) except for the small 2–4 cm long terminal inflorescence (Fig. 2), which is absent in *A. graecizans* but present in *A. viridis*. The flowers were normal but their number was considerably reduced to 3 to 7 in each glomerule in comparison to 23 to 38 and 7 to 10 in female and male parents respectively. Very few male flowers were observed in the hybrid. Some glomerules were even completely devoid of them.

In both the species 17 bivalents were observed at diakinesis and metaphase I (Figs. 3–4). In *A. graecizans* one of the bivalents was seen to disjoin early in most of the cells, a feature common to many species of the genus[5]. The bivalents had one or two chiasmata. Anaphase I was regular in both the taxa. Subsequent stages of meiosis were also regular resulting in normal pollen and seed setting.

FIGS. 1–5. Fig. 1. (from l to r). *Amaranthus graecizans*, F_1 hybrid and *A. viridis*. Fig. 2. Terminal portion of a branch of the hybrid. Figs. 3–5. Metaphase I. 17 II. *A. graecizans*. *A. viridis* and F_1 *A. graecizans* × *A. viridis* respectively. (All, × 800).

Like the parents, the hybrid also showed 17 bivalents at diakinesis and metaphase I (Fig. 5). Anaphase I, however, was characterised by late disjunction of 1 to 5 bivalents. Ultimately the components reach their poles and further course is apparently normal. However, there is complete pollen and seed sterility.

Khoshoo and Pal[3] and Pal and Khoshoo[4-6] observed translocations involving 4 to 14 chromosomes in the four different interspecific hybrids, studied by them from the section Blitopsis to which the parents of the present hybrid belong. On the basis of their observations, they concluded that chromosomal translocations appeared to be an important factor underlying species differentiation in this section of the genus. However, in the interspecific hybrid reported here only bivalents were observed and no evidence of chromosomal association or translocation was found. The situation therefore appears to be akin to what has been reported by Pal and Khoshoo[4] in section *Amaranthus* of the genus where there is complete bivalent pairing in the hybrids and chromosomal differentiation is limited only to small segments (cryptic structural hybridity *sensu* Stebbins[6]) which do not in any way impair bivalent pairing but result in complete pollen and seed sterility.

The author is grateful to Dr. T. N. Khoshoo, Deputy Director-in-charge, National Botanic Gardens, for his guidance and facilities and sincere thanks are due to Dr. M. Pal for the material and to Mr. T. K. Sharma, for the illustrations. The present study was carried out under the PL-480 grant FG-In-511.

National Botanic Gardens, K. J. MADHUSOODANAN.
Lucknow 226 001, India,
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A TWIN GRAIN MUTANT IN BARLEY

A TWIN grain mutant was observed in the segregating population of a cross between a 6-rowed barley variety K 24 and a 2 rowed exotic barley culture EB 772. In this mutant most of the central spikelets were doubled and the extra spikelet was covering the central one and produced grains. (Figs. 1–2, 3).

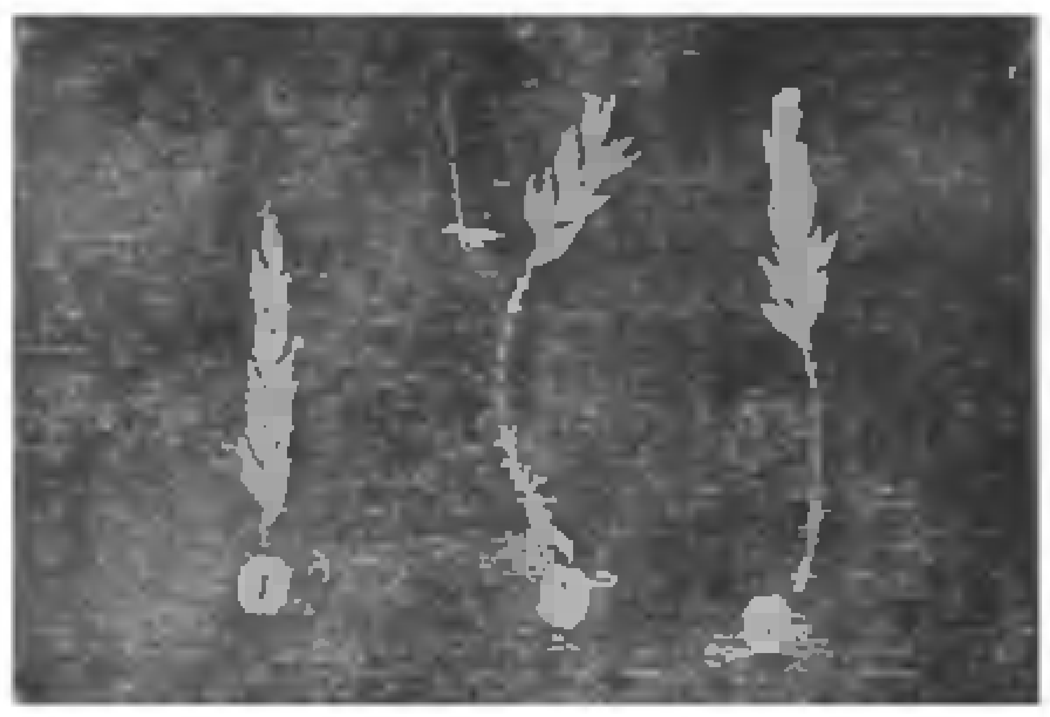

FIG. 1. Samples of normal and mutant spike where lateral grains are removed. 1, normal; 2 and 3, Twin grains.

Critical observation revealed that the rachilla producing the central spikelet was branched and produced the extra spikelet. Pollen and ovule fertility were normal, however, some of the extra spikelets produced no grains.

Department of Agricultural Botany, GANESH PRASAD.
S.D.J. Post Graduate College,
Chandeshwar, Azamgarh, U.P., India,
January 6, 1976.