P. akinetum and *P. prostratum* were found growing epiphytically in knee-deep water of the temporary ponds of Jhusi (Allahabad) and Mouri (Pratapgarh) Districts respectively.

P. akinetum Tupa: Thallus tufts forming, mainly consists of prostrate filaments of usually 6–10 cells but occasionally up to 20 cells in a single filament. Prostrate filaments are irregularly branched and may produce extremely short erect filaments of usually 3–4 cells. Often young thalli have a distinct main creeping filament which may have branches of 3–4 elongated and terminal tapering cells (figure 2). Each of the elongated young cells may be up to 5 μ wide and 10 μ long and becomes subspherical and enlarged rapidly up to 14 μ in diameter (figure 3). All cells possess a single dark green parietal band-shaped chloroplast which covers the entire surface of the cell embedded in which there is a single prominent centrally placed pyrenoid.

Asexual reproduction occurs by zoospores as well as akinetes. Zoosporangia are spherical, usually enlarged up to 17 μ in diameter (figure 4). From each zoosporangium, 4 to 8 zoospores are released. Zoospores are quadriflagellate measuring up to 5 μ in diameter and 8 μ in length. They are pear-shaped and have a cup-shaped chloroplast with a posterior pyrenoid and a distinct anteriorly placed eye spot (figure 1). Akinetes are formed by enlargement of cells and accumulation of starch granules. The cell wall gets thickened and becomes characteristically rust brown in colour (figure 5). Akinetes show unipolar germination.
Epiphytic on blades of aquatic grasses.

P. prostratum Tupa: Thallus is much prominent as compared to *P. akinetum* Tupa. Prostrate system consists of richly branched pseudoparenchymatous single-layered disc. Mature thalli possess numerous erect branches and thus become cushion-shaped (figures 7 and 8). Cells are 5–10 μ in diameter and 9–15 μ in length. The single parietal chloroplast in each cell contains a single pyrenoid. Central cells of the prostrate system appear angular and rounded due to mutual compression.

Asexual reproduction occurs by zoospores. Zoosporangia are spherical and up to 15 μ diameter. Each zoosporangium produces up to 8 zoospores. Zoospores are quadriflagellate ovoid and have a cup-shaped chloroplast with a single posterior pyrenoid and an eye-spot (figure 6). The zoospores are 5 μ in diameter and 9 μ in length.
Epiphytic on *Vallisneria spiralis* Linn.

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SPONTANEOUS ALLOTETRAPLOID OF *COIX GIGANTEA* × *C. AQUATICA*

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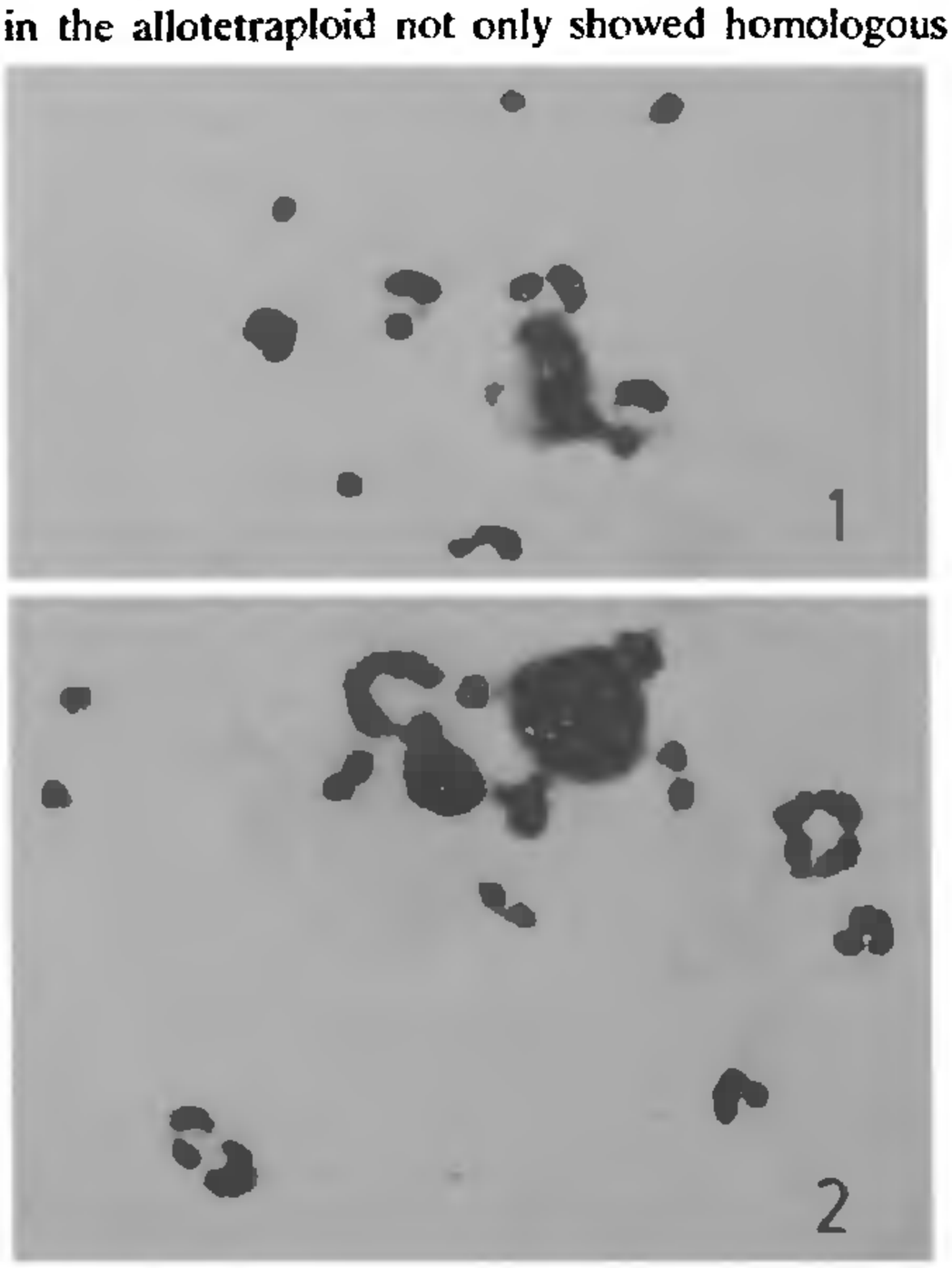
HYBRIDIZATION followed by chromosome doubling has played a significant role in plant evolution since many allopolyploids with perfectly paired chromosomes have established themselves as fertile and genetically constant new species. Majority of the spontaneous polyploids have now been known to be either allopolyploids or segmental allopolyploids rather than autopolyploids[1–3]. The true autopolyploids are therefore probably the only ones that are produced artificially—the colchiploids. A spontaneous allotetraploid ($2n = 28$), isolated from the hybrid progeny of *Coix gigantea* ($2n = 18$) × *C. aquatica* ($2n = 10$), is reported here.

Coix is an oriental relative of the cultivated maize. Three species of *Coix* are reported from India[4] and two of these, *C. gigantea* ($2n = 20$) from Purandhar[5] and *C. aquatica* ($2n = 10$) from Mhaismal[6], are involved in the present study. Nullisomics of *C. gigantea* ($2n = 2$, $2n = 18$) were obtained in large number[7] through nondisjunction[8] in a domesticated population maintained at the Botanical Garden of this university. When the aneuploids of *C. gigantea*[9] were grown in close association with *C. aquatica*, spontaneous interspecific hybrids with varied chromosome numbers were obtained through open pollination[10]. The interspecific hybrids were semifertile and when hybrid derivatives were screened cytologically through acetocarmine squashes, individuals with chromosome numbers in the range of $2n = 10$ to $2n = 21$ were isolated[11]. The present allotetraploid plant was detected among the seed progeny of this population.

At diakinesis, the F_1 hybrid ($2n = 14$) between nullisomic *C. gigantea* ($2n = 18$) and *C. aquatica* ($2n = 10$) showed perfect pairing between chromosomes of the two genomes (figure 1) indicating a close phylogenetic relation between the two species. The strong chromosome homology further led even to the formation of multivalents[12]. The *aquatica* genome is characterized by five large metacentric chromosomes of more or less equal size (5A), while nullisomic *gigantea* genome carries one large and eight medium/small chromosomes (9G). This relative size difference was maintained in the hybrid and helped to identify chromosomes of the two genomes[13]. In the F_1 hybrids, heteromorphic bivalents (A-G) were common (figure 1), while the trivalents (A-G-A or G-A-G) and quadrivalents (A-G-A-G) comprised of alternate pairing of chromosomes from the two species[12]. Intragenomic pairing (A-A or G-C) was absent in the hybrids.

The allotetraploid that emerged from the hybrid progeny carried 10 *aquatica* and 18 *gigantea* chromosomes ($2n = 28$). The two genomes having doubled in the allotetraploid not only showed homologous pairing (A-A or G-G) but also formed multivalents (figure 2), due to intergenomic pairing. Clear chromosomal configurations were very rare and high multivalency/secondary association/stickiness led to chromosomal clumping. This situation adversely affected orientation and segregation of *aquatica* and *gigantea* chromosomes during meiosis with the result that the plant was completely sterile. Fertility is usually restored in the allotetraploids of hybrids between two distantly related species, but probably this may not hold true if the two species involved in hybridization show close chromosome homology, as in the present case.



Figures 1 and 2. Chromosomal configurations in the F_1 and allotetraploid of *C. gigantea* × *C. aquatica*. **1.** Diakinesis in F_1 showing $2n = 14$ (5II + 4I, note 4 heteromorphic bivalents). **2.** Diakinesis in the allotetraploid showing $2n = 28$ (2IV + 1III + 7II + 3I) (×1800).

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