formation which following inversion produced a daughter colony.

Sexual reproduction was accomplished by biflagellate gametes (transformed vegetative cells) lacking a cell wall and characteristic shape but having an anterior colourless papilla (Fig. 4). The alga was heterothallic and mating reaction started soon after mixing compatible clones from cultures. The first sign of mating reaction was marked by clumping of colonies followed by liberation of gametes. Gametes of opposite mating type paired with each other by agglutination of their flagellar tips and later by their papillae. The cytoplasmic bridge between the two gametes broadens gradually and resulted in cytoplasmic fusion. The spherical, quadriflagellate planozygote after a short period of motility came to rest, enlarged slightly and shedded its flagella (Fig. 5). The zygote later secreted a secondary wall internal to the smooth primary membrane. As the secondary wall thickened, spine-like processes develop all over its surface. At maturity the primary membrane was ultimately lost, the spiny zygospore increased considerably in size and changed its colour from green to orange-red (Fig. 6). The mature zygospores ranged between 30–37 μm in diameter with the length of spine 5 to 7 μm.

The Indian isolates of *Volvulina steinii* (present study) confirms the Carefoot's[6] observations of the two additional attributes, *i.e.*, presence of apical mating papillae in gametes and production of spiny-walled zygospores, which were not recorded by earlier workers for this species. Interestingly these two characters are also known for *V. pringsheimii*[1,2] which differs from *V. steinii* only by the presence of a pyrenoid in the cell and occurrence of a uniform mucilaginous sheath common to the entire coenobium. Stein[4] recorded smooth-walled zygospores in *V. steinii*. The production of only spiny-walled zygospores from the mating of all the clones isolated from two populations at Varanasi is noteworthy. Carefoot[6], however, recognised three sexually isolated groups of clones from different geographical area. Of these, the clones of two sexually isolated groups produced only smooth-walled zygospores whereas the third group produced always spiny-walled zygospores. Due to lack of production of smooth-walled zygospores *in vivo* as well as from the crosses of clones *in vitro*, it is presumed that the present isolates of *V. steinii* consist of sexually isolated group of clones characterised by the production of spiny-walled zygospores.

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A MEALYBUG ATTACKING *PARTHENIUM HYSTEROPHORUS* LINN.

THE pernicious weed *Parthenium hysterophorus* L. has spread like wild fire both in cities and in the rural parts of many States in India[1–3]. Since it competes with useful crop plants and causes a number of diseases[4–6], its eardication has become important. Some chemicals are known to control the growth of this weed. However, there cannot be a better method than biological control.

It has been shown that an aphid (*Aphis fabae*) feeding on *Ipomoea purga* can cause stunted growth of *Parthenium*[5]. There are also reports of phylloidy in *Parthenium* caused by mycoplasma-like bodies[7,8]. Moreover such plants are often heavily infested by aphids[9]. The presence of mealybugs, *Ferrisa virgata* Cockerell, on the roots of *Parthenium* has also been reported[10]. However, a type of mealybug that can cause complete destruction of the plant has not been reported.

In our garden a few *Parthenium* plants were found infested by mealybugs. Within a few days, the plants started wilting. When *Parthenium* plants were grown in pots a few mealybugs were transferred, the bugs multiplied within a few days and covered the leaves, inflorescence and axils of branches. Within a week the entire group of plants completely wilted without producing a single seed. Even after eradication of the mealybugs, regeneration of the plants was not possible.

The bug has been identified as *Planococcus* sp. closely resembling *Planococcus citri* Risso. It is also capable of growing on citrus.

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GIEMSA BANDING PATTERN IN THE LANGUR MONKEY—*PRESBYTIS ENTELLUS ENTELLUS* (DUFR.)

Presbytis entellus entellus is a hylobate, commonly known as Indian Hanuman langur. Though cytogenetic studies in *Presbytis* have been reported earlier[1–4], the Giemsa banding pattern of the metaphase chromosomes have not been investgated in this species. The karyotype analysis is constructed based upon the size of chromosome, position of the centromere and the characteristic banding pattern.

Metaphase chromosome spreads were prepared by culturing the peripheral blood, as per the standard procedure[5]. Slides were dried on a hot plate (50°–60° C) for 1–2 minutes after fixing. Giemsa trypsin banding was carried out according to modified procedure of Sun *et al.*[6].

Heat-dried slides were allowed to age for 3–4 days, and incubated at 60° C overnight (16–18 h). The slides were then incubated in phosphate buffer, 0·025 M, pH 6·8, at 56° for 10 minutes. The excess buffer was blotted off. The slides were flooded for 5 minutes with the staining mixture prepared as follows: 36·5 ml of phosphate buffer, 12·5 ml of AR grade methanol, 0·25 ml of trypsin–EDTA and 1·0 ml of 1% Giemsa stock solution. The slides were rinsed twice with distilled water, dried and mounted in neutral mounting medium.

A total of 110 metaphases were analysed and the diploid chromosome number $2n = 44$ was consistent in all the cells. The karyotype is comparable with that in earlier reports[1–4]. A typical Giemsa banded metaphase spread is shown in Fig. 1. The characteristic banding pattern enabled precise identification of the homologous pairs of autosomes and construction of the karyotype (Figs. 2 and 3).

From the Giemsa banding pattern, it is obvious that the autosome pairs 7 and 17 show a characteristic secondary constriction. Pair 17, characteristic of the genus[7], is a submetacentric chromosome with an exceptionally large achromatic gap in the long arm (marked secondary constriction). There is a wide variation in the size of this achromatic gap between the two homologues within the same metaphase spread and in the same animal, leading to an apparent variation in the length of the two chromosomes. The homologues also have a tendency for association in metaphase spreads. The Y chromosome in this species, the smallest of the complement, is an acrocentric

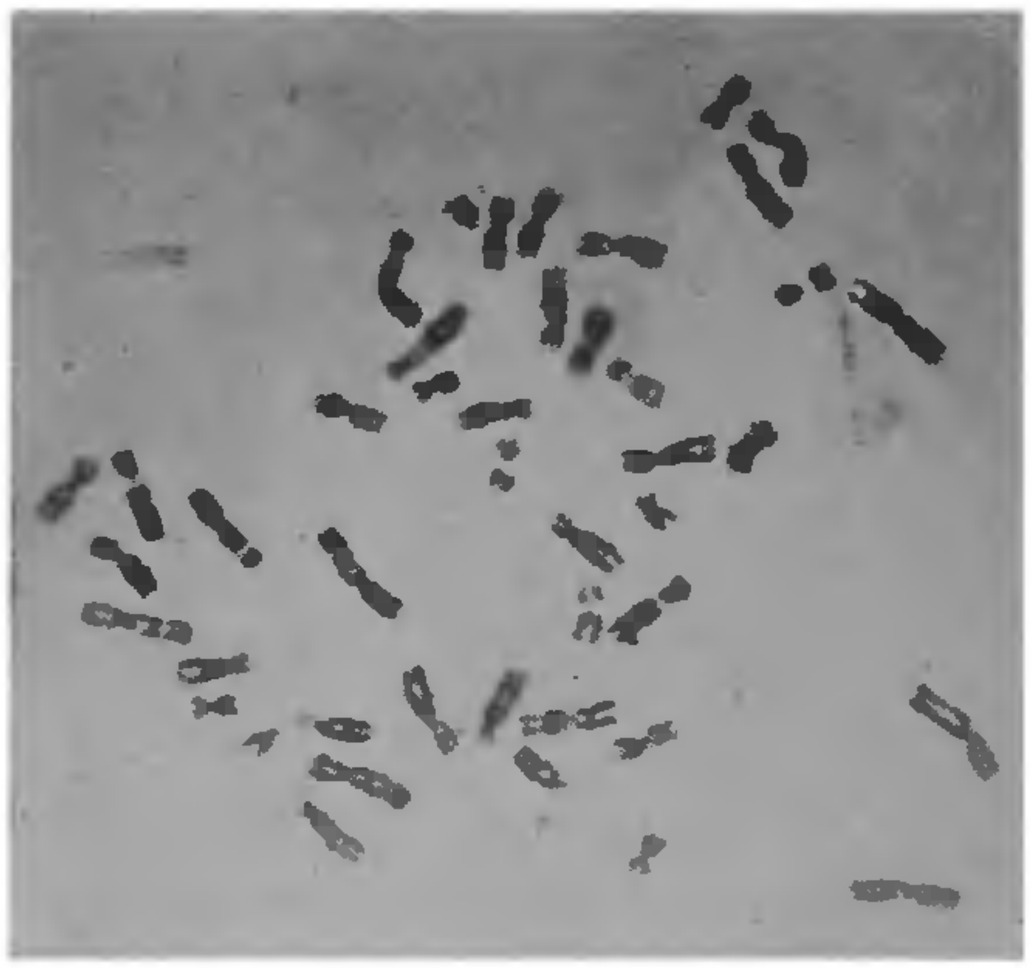

FIG. 1. Giemsa banded metaphase spread ($2n = 44$, XX).

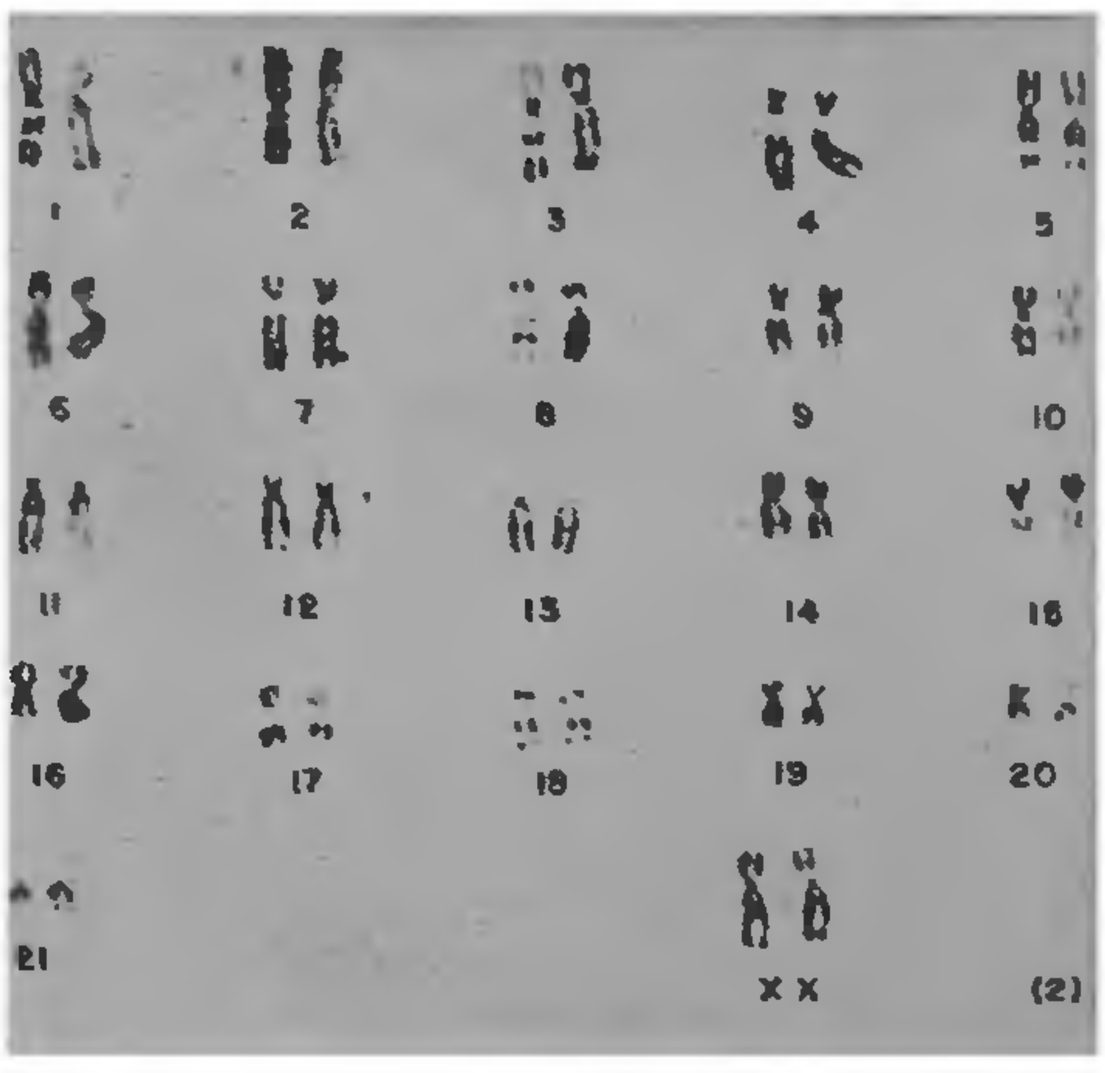

FIG. 2. Karyotype of female *Presbytis entellus entellus* (dufr.).