Table 1 *Frequency of chromosome associations of four homologues at diakinesis in the tetrasomic*

Total number of PMCs scored	II + II	IV	III + I	II + 2 I
128	76	38	10	4

in 33.33% of cells, 2–4 chromosomes were non-oriented on the metaphase plate, 2 being the most common occurrence. Formation of bridges and 2–12 laggards was observed during anaphase I and telophase I. Pollen fertility was low (10.67%) when compared to that of the normal (92.6%). Genic imbalance caused by tetrasomy leads to abnormal meiosis which seems to be responsible for poor fertility. Reduced fertility and marked phenotypic alteration were recorded in aneuploids of pearl millet[1] and *Trigonella*[2] also. There was no fruit formation either on open pollination, selfing or crossing.

Chromosomal deviation from the normal, resulting in nullisomics ($2n-2$) and tetrasomics ($2n+2$) had been recorded in several plants[3]. Although in *Capsicum*, multiple aneuploids[4–6] were on record, so far there are no reports on detailed cytological behaviour of the tetrasomics. Occurrence of a tetrasome in triploid progeny was reported by chennaveeraiah and Habib[7]. It can be inferred that the $2n+2$ (26) chromosome plants might have originated by the chance union of two aneuploid gametes ($n+1$ i.e. 13) or a normal and aneuploid gamete (n and $n+2$ i.e. 12 and 14) formed in the triploid parent plant.

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ASHY STEM BLIGHT OF SOYBEAN IN INDIA

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CHARCOAL rot disease of soybean caused by *Rhizoctonia bataticola* (Taub.) Butler (Pycnidial state–*Macrophomina phaseolina* (Tassi) Goid.), is an important problem in the northern plains of the country[1]. The fungus causes blight of young seedlings and attacks the root and stem bases of grown-up plants producing typical charcoal rot symptoms[1,2]. In the present communication symptoms on soybean induced by *R. bataticola* are reported.

During 1983 and 1984, some soybean cultivars grown at the IARI farm in New Delhi exhibited stem blight symptoms during September-October. The symptoms were confined to adult plants. Initially, elongated brownish lesions appeared at several points on the stem which later became densely specked with minute black sclerotia. Due to production of sclerotia, the colour of the lesion changed to grey. Similar symptoms were also noticed on the pods and 5–9% seeds obtained from such pods had sclerotia of the fungus on surface. The disease caused a premature ripening of the crop. Repeated isolations from the diseased stem tissue, pods and seed, yielded a culture of *R. bataticola* producing sclerotia only on potato dextrose agar. Samples of the blighted stem have been deposited in the HCIO, IARI, New Delhi (accession no. **37**, 194).

Ashy stem blight caused by this fungus has been reported in beans, cowpea, mustard, snapbean and urid[3] but the present report on soybean appears to be a new record. The ashy stem blight disease has been attributed to be produced as a result of infection caused by the pycnidiospores of the fungus. Luttrell and Garren[4], and Ghaffar[5] reproduced the ashy stem blight symptoms of snapbean and mustard by inoculation with pycnidiospores. Patel[6] suspected similar role of pycnidiospores in causing ashy stem blight of cowpea. We observed that the blighted soybean seedlings due to *R. bataticola*, produced numerous pycnidia during August in field as well as in pot culture. Pycnidiospores from such diseased seedlings seem to be responsible for causing subsequent infection in the crop producing ashy stem blight. This report also confirmed the

earlier findings[7] proving the seed-borne nature of *R. bataticola* in soybean.

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FERTILITY OF FROZEN SEMEN IN SURTI BUFFALOES

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THE ICAR expert panel has proposed research regarding the improvement in conception rates of buffaloes during low breeding season (summer) by using frozen semen produced during high breeding season (winter). However, no reports are available on the findings of such studies. An attempt was therefore made to elucidate the effect of using frozen semen produced and utilized during winter as well as summer seasons and vice versa on fertility.

Ejaculates numbering 136 and with initial motility above 70% were obtained from 4 Surti buffalo bulls (SB_1, SB_2, SB_3 and SB_4) during low and high breeding seasons. These were diluted randomly in 3 extenders viz, tris fructose yolk glycerol (TFYG), egg yolk citrate glycerol (EYCG) and lactose yolk glycerol (LYG) at 6% glycerol level keeping 25 million sperms per 0.5 ml straw and were frozen in liquid nitrogen vapour as described earlier[1]. Post-thaw motility was assessed immediately after freezing and after 1 week of storage. Frozen semen doses were preserved in liquid nitrogen at least for a month before use. A total of 3490 fresh inseminations were performed under field conditions in the Panchmahal District by trained inseminators using summer frozen semen during summer and winter, and winter frozen semen during winter and summer seasons. Pregnancy was confirmed per-rectally 90 days later. The data were analysed statistically[2].

The freezability and fertility according to the seasons of freezing and inseminations presented in table 1 show that the average freezability and fertility was 51.58% and 39.82% respectively. The freezability differed significantly between bulls (45.92–55.68%) and seasons (48.92–53.87%) but not between dilutors (50.63–52.28%). Fertility results were significantly different between bulls (38.34–44.86%), dilutors (37.40–42.69%) and seasons (32.08–42.17%) regardless of freezing or insemination seasons. The fertility and freezability results for bull No. SB_1, TFYG diluent and winter season were significantly superior over others.

It is interesting to note that significantly higher conception rates could be obtained when frozen semen produced during winter was used for inseminations during winter (42.17%) or summer (39.27%) seasons as compared to frozen semen produced and used during summer (32.08%). This meant that winter frozen semen appeared to possess an inherent superior fertilizing ability as compared to the semen produced during summer season. Although the summer frozen semen used during winter gave significantly higher conception rate (38.36%) as compared to that obtained by using it during summer (32.08%), this was low when compared with the conception rate obtained with winter frozen semen used in winter (42.17%) or summer (39.27%). This indicated that the fertilizing ability of semen produced during summer season was poor.

The above results emphasize the need for further studies so that frozen semen technology can be made more useful to improve fertility in dairy buffaloes especially during low breeding season using frozen semen produced in high breeding season.

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