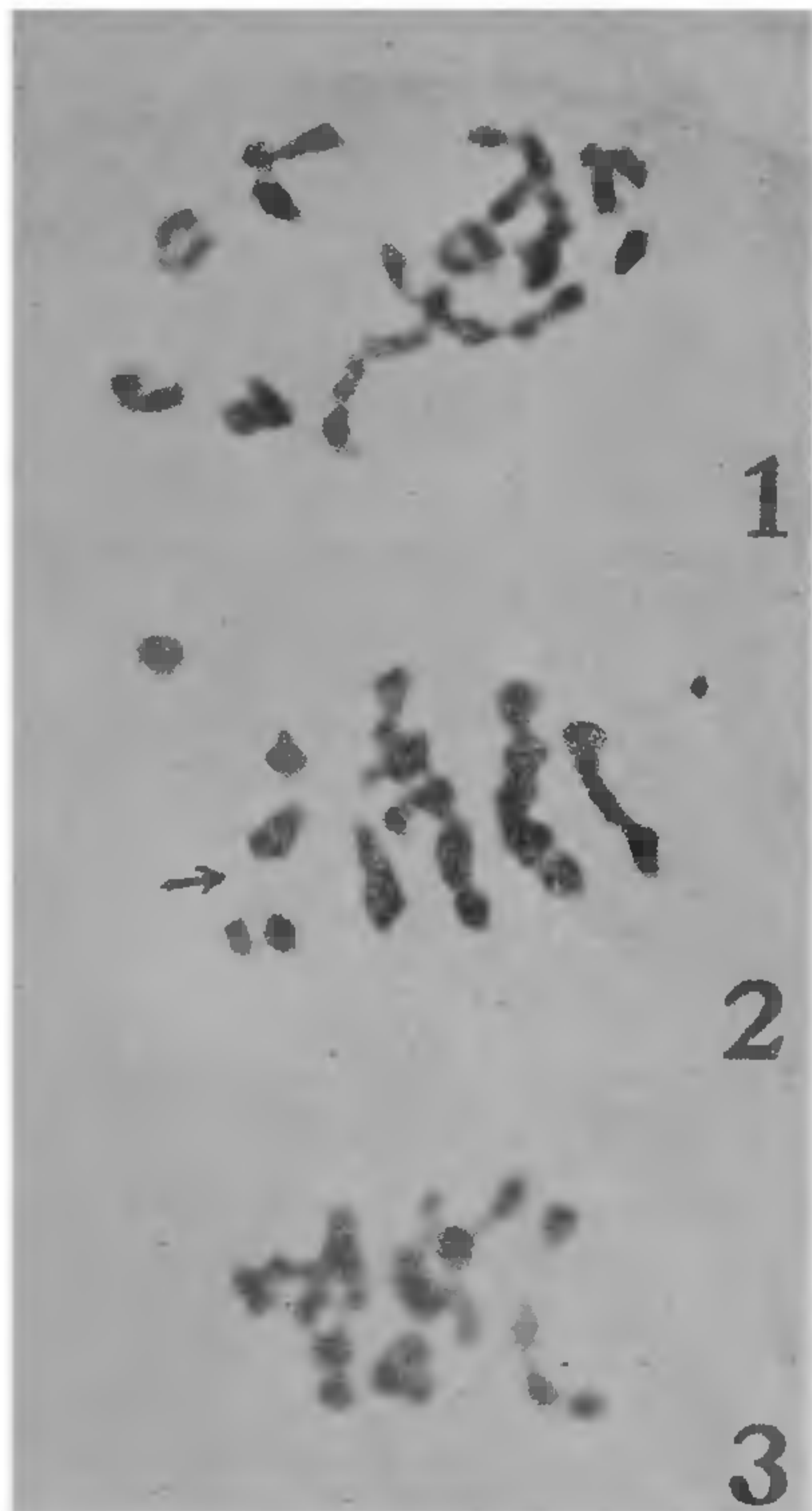


in nearly 50% of the nuclei (Table I). Photomicrographs representing some of the chromosome associations are shown in Figs. 1, 2 and 3.



FIGS. 1-3. Fig. 1. Part of PMC at diakinesis showing a chain of four, nine bivalents and two univalents. Fig. 2. Diakinesis—Metaphase I with one ring of four and ten bivalents. Fig. 3. Metaphase I with a chain of four (extreme right) and ten bivalents (all $\times 1,500$).

While the occurrence of 29 nuclei (at diakinesis and metaphase I) with 12 bivalents immediately suggests that the chromosomes of the two species have sufficient homologies to pair in the F_1 , formation of one or more higher chromosome associations clearly shows that a given chromosome of one parent also has homologies with more than one of them in the other parent. Extensive chromosomal repatterning—interchanges—is apparently the most significant cytological difference separating the two species. These results are in total disagreement with the findings of Rajasekaran³, who observed formation of 12 bivalents in his material which was completely sterile. Some of our plants were fertile (upto 15%) and have yielded some F_2 and back-

cross progenies. The reasons for this divergence in the chromosome behaviour at meiosis and the reproductive potentialities of F_1 hybrids of similar (but not identical) parentage need to be understood. Further studies on these and other aspects are in progress.

One of us (S. V. R.) is thankful to the CSIR, for the award of a Junior Research Fellowship.

Department of Botany, S. VEERABHADRA RAO.
Andhra University, B. G. S. RAO.
Waltair 530 003,
July 9, 1976.

1. Magoon, M. L., Ramanujam, S., and Cooper, D. C., *Caryologia*, 1962, 15, 151.
2. Rajasekaran, S., *Annamalai Univ. Agric. Res. Annual*, 1969, 1, 49.
3. —, *Caryologia*, 1971, 24, 261.
4. Rao, B. G. S., *Eco. Bot.*, 1972, 26, 189.

GROWTH PATTERN IN JUTE (*CORCHORUS OLITORIUS* L.)

FOR improving fibre-yield of jute, plant selections are made on the basis of its height and base diameter. Further, a variety, which attains a large plant size within a reasonably short time, is likely to be preferred, particularly because the tenacity of fibre decreases with advancing age (Maiti *et al*, 1975).

The present investigation was undertaken at the Government Farm, Chinsurah, in 1973 with 22 types² of *C. olitorius* for studying the rate of growth in respect of plant height, base diameter and yield of fibre. The layout of the experiment was randomised blocks with six replications, each plot being represented by a row of 15 plants. Plant heights (P.H.) and base diameters (B.D.) were recorded on 5 plants selected at random from each row of one block and kept fixed, at 10-day intervals, from 80 to 130 days' crop age. The remaining five blocks were harvested one after another, at intervals of 10 days. At harvest, 10 plants were selected at random from a row and fibre was extracted and weighed. In the second set, five types were selected at random and P.H. and B.D. of ten plants of each were recorded for all the five harvests.

One series of data consisted of P.H. and B.D. values of each selected plant at different points of time and another of fibre yields of two bundles of 5 plants each of different ages of a type.

Since clear trends were not found from the fibre yield data of different sets of 5 plants, a regression of yield (y) on P.H., B.D. and age (x) was calculated from the second set of data ($r = - 3.3312$

+ 0.0145 P.H. + 2.2731 B.D. + 1.2986 x), and P.H. and B.D. values of the same plants, recorded at 10-day intervals in the first set, were then fed into this regression for estimating the yields of the types at different time points.

The increments in P.H., B.D. and the estimated yield of all the types showed, on the whole, an increasing trend followed by a decreasing one. The data were fitted to a second degree curve for locating the point where the maximum occurred. In the case of yield, the logistic curve was also fitted to see the agreement between the two methods.

The 10-day periods, during which the increment was maximum in respect of all the three characters as indicated by the second degree curve, and the points at which the rate of fibre-growth was maximum according to the curve of increments (second degree) and the curve of yields (logistic), respectively, were determined. A more or less sigmoid pattern of growth was followed by P.H., B.D. and yield, particularly the first. Further, in most cases, B.D. increased at an increasing rate for a longer period than P.H., and the time points, upto which fibre grew at an increasing rate was intermediate between P.H. and B.D. According to the two curves, one of increments and another of fibre yield, the point of maximum growth rate of fibre yield of most of the types was between 95 and 105 days, the mode being near 100 days. The agreement between the values of maximum growth obtained by the two methods is quite close in a number of types. Types, 1, 3, 5, 7, 9, 10, 12, 13, 14, 15 and 22, for which the point of maximum growth is near for about 100 days can be tentatively grouped together and 6, 19 and 20 in which the point is earlier, can be included in another group. Types 2, 4, 8 and 11 can possibly be put together in an intermediate group. Those, for which values do not agree, have not been assigned to any group. There appears to be a tendency of the growth rate to fall more slowly when the peak occurs at an earlier age.

An attempt was also made to use the logistic curve of growth to determine the optimum date of harvest. It was found that if a loss in yield of 10% could be afforded, the types could be harvested at ages between 110 and 114 days, i.e., a week or ten days earlier.

The authors are grateful to ICAR and the Directorate of Agriculture, W.B., for the facilities provided.

Department of Botany,
University College of Science,
Calcutta 700 019,
June 14, 1976,

S. SEN.
P. DATTA.
S. N. MAITI.
S. R. BISWAS.

* Types used : 1. Chensura Green, 2. IRO 632, 3. JRO 753, 4. Sudan Green, 5. Bangkok-I, 6. JRO 620, 7. Least pigmented, 8. Crumpled leaf, 9. Olitorius Red-I, 10. Olitorius Red-II, 11. R-26, 12. O 50-4963, 13. O 59-471, 14. Saly-out, 15. Wild Olitorius Red, 16. Black Grey Seed, 17. Small Seed, 18. JRO 878, 19. JRO 4362, 20. JRO 7835, 21. Tanganyika-I, 22. Tanganyika-II.

1. Maiti, S. N., Neogi, A. K. and Sen, S., *Curr. Sci.*; 1975. 44, 274.

SUB-HAPLOID POLLEN IN *ALOE BARBADENSIS* MILL.

ONE of the several advantages of studying pollen mitosis is the opportunity it provides for characterizing haploid chromosomal complements, especially in plants showing irregular meiosis. While testing pollen fertility and studying pollen mitosis in an ecotype of *Aloe barbadensis*, the author came across a few cases of sub-haploid pollen. A preliminary report of such pollen grain is presented here. Fresh anthers were squashed in aceto-carmin and pollen with intact wall alone were considered for scoring deficiency.

Clones of *A. barbadensis* growing here are self-incompatible¹ and show as high as 60% pollen sterility. As a result, there is no fruit setting. Meiotic irregularities in this plant leading to high pollen sterility have been reported earlier by the author².

A majority of the functional microspores show a typical haploid complement of 7 chromosomes (Fig. 1). It comprises four long and three short, more or less acrocentric chromosomes typical of the tribe Aloinae. The sterile pollen grains are irregular in shape, do not take stain and are enucleate at maturity. While studying first mitosis in the microspores, a few were noted with less than seven chromosomes. Meiosis in this plant is highly irregular, resulting in bridges and laggards of various types. This leads to the formation of micronuclei and polyspory (Fig. 2). The deficient pollen originate from such abnormal microspores formed due to aberrant anaphase movements.

In higher plants, deficient microspores usually abort. They are unable to complete the mitotic divisions and the development necessary to form gametophytes. Such pollen grains are also smaller than normal and appear empty. Pollen grains even with just one chromosome less than the haploid complement fail to develop³⁻⁶. In the present plant, however, some of the deficient pollen are nearly normal in size, synthesize the pollen wall, but are usually less stained and do not seem to develop further into gametophytes. The chromosomes do become double indicating a normal cycle of DNA