

the cobs after harvest, and storage in a dry place would cut down aflatoxin B<sub>1</sub> formation on maize.

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Dept. of Plant Pathology, OM PRAKASH.  
Rajasthan College of Agriculture, BABU SINGH SIRADHANA.  
Udaipur,  
March 3, 1978.

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#### MEIOSIS IN THE INTERSPECIFIC HYBRID OF TWO SPINOUS SOLANUMS AND ITS BEARING ON THEIR AFFINITIES

It is recognised from the cytogenetic point of view that data obtained on chromosome pairing and chiasma formation in interspecific hybrids elucidate the evolutionary affinities between the concerned taxa. As the mutual relationships among many of the spinous Solanums, which are of economic importance<sup>1,2</sup>, are poorly understood<sup>3-5</sup>, studies were initiated in this direction and the chromosome behaviour in the hybrid *S. integrifolium* × *S. surattense* is reported now.

Following a newly devised hand pollination technique<sup>7</sup> and the method of screening for functional pistillate flowers, 85 pollinations were made and a solitary fruit with a single seed was obtained which germinated to yield the interspecific hybrid. Obviously the crossability barriers between the two species have developed to the extreme such that less than 1% of ovules were capable of post-fertilisation development.

The solitary hybrid resembled one or the other of the parents in some exomorphic characters and was intermediate in others. This hybrid, however, could not be maintained for more than a few weeks after flowering. The development to the extreme of cross-

ability barriers suggested earlier and the post-zygotic isolating mechanisms appear to have been strongly developed such that the F-1 heterozygote cannot be sustained for long, even in its vegetative phase<sup>6</sup>.

In the hybrid, the chromosome associations at meiosis I varied in the different PMCs analysed. They ranged from a maximum of 12 II to I-IV + 10 II per PMC. Other kinds of associations were also met with. A total of 22 PMCs were analysed at diakinesis and the relative frequencies of different kinds of associations are summarised in Table I. The average chiasma frequency of 1.37 per bivalent in the F-1 was significantly lower than that in either of the parents (1.61 for *S. integrifolium* and 1.57 for *S. surattense*).

TABLE I

The different chromosome associations and their frequencies at diakinesis in the F-1 hybrid of *S. integrifolium* × *S. surattense*

Frequency	Chromosome associations			
	I	II	III	IV
8	..	10	..	1
3	2	9	..	1
1	1	10	1	..
1	3	9	1	..
5	..	12	..	..
4	2	11	..	..
Total	22			

The occurrence of 22.8% of PMCs with twelve bivalents suggests that the chromosomes of the two species have retained sufficient ancestral homologies to permit their intergenomic pairing in the F-1 heterozygote. The occurrence of higher chromosome associations of at least one per PMC (59.1%) also indicates that a given chromosome of one species has homeologies with more than one of them in the other species. Obviously chromosomal repatterning has contributed to the cytological divergence of the two species.

Results on selfing the F-1 and back-crossing it with both the parents revealed that the hybrid is about 98% sterile both ways. With regular chromosome pairing, followed by normal anaphase I segregation and meiosis II as observed now, the sterility is apparently attributable to genetic imbalances brought about by segregational events following intergenomic recombination between one or more of chromosomes of the parental genomes, when included in a common nucleus.

While the species are close enough to have retained the capacity to exchange their genetic content through pairing and crossing over in the heterozygous state, they are separated quite apart through genomic differences so as to retain their individual species status by the development of isolation barriers, mostly concerned with post-zygotic imbalances.

These conclusions are comparable to those arrived at in the differentiation of *S. melongena*, *S. surattense* and *S. trilobatum*<sup>8,9</sup>. Thus structural repatterning of chromosomes, besides assemblage of adaptive genes for species differentiation seems to have played an important role in the divergence of the different spinous Solanum species. The nature and extent to which such phenomena distinguish the different species in question will be considered elsewhere.

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Department of Botany,  
Andhra University,  
Waltair, March 21, 1978.

P. B. KIRTI.  
B. G. S. RAO.

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#### EFFECT OF JUVENILE HORMONE ANALOGUES ON REPRODUCTION IN THE CRICKET, *GRYLLODES SIGILLATUS* WALKER

JUVENILE hormone analogues inhibit fecundity and fertility in the wasp, *Habrobracon juglandis*<sup>1</sup> and the mosquito, *Aedes aegypti*<sup>2</sup>. Similarly application of JH analogues produced several ovarian defects and also embryonic disorders in the firebrat, *Thermobia domestica*<sup>3</sup>. Transmission of JH analogues during copulation inhibiting fertility was observed in *Dysdercus cingulatus*<sup>4</sup>, *Pyrrhocoris apterus*<sup>5</sup>, and *Dysdercus koenigii*<sup>6</sup>. The present investigation was conducted to know the effects of JH analogues on reproduction in the cricket, *Grylloides sigillatus*.

Two JH analogues namely R-20-3600 (Hoffmann-La Roche) and R-20458 (Stauffer Chemical) were used to conduct Experiments I and II respectively on crickets. Freshly ecdysed (0-24 hr) male and female were selected from the stock culture provided with concentrated poultry feed, water vial and strips of folded filter papers. The sexes were separated earlier at their nymphal stages. The selected crickets separately treated with 1 $\mu$ l of each JH analogue were kept isolated for three days. Combinations of males and females constituted different groups as follows:

- A. Treated male with treated female
- B. Treated male with normal female
- C. Normal male with treated female
- D. Normal male with normal female (Control).

There were ten pairs of male and female crickets in each group of each experiment. They were later incubated at  $30 \pm 1^\circ \text{C}$  and supplied with sterilised sand cups to collect eggs for 2 weeks. The eggs were transferred to filter paper and incubated at  $35 \pm 1^\circ \text{C}$ . Nymphs hatched out were recorded and the per cent hatchability was calculated. In both the experiments, the treated males mated normally, the treated females laid good number of normal eggs and showed no ovarian defects. Average per cent hatchabilities in the groups A, B, C and D were 82.5, 87.6, 87.4 and 92.0 in Experiment I and 85.4, 91.8, 84.8 and 89.4 in Experiment II. Obviously there was no significant difference in hatchabilities between any two treatments.

The available literature reveals that the JH analogues applied to male, transmitted to female during copulation and inhibited the egg hatchability<sup>5,6</sup>. When administered orally to the female mosquito, *Anopheles stephensi*, they lead to the development of abnormal eggs and prevented hatchability<sup>7</sup>. Our results when compared to these, are quite interesting. The JH analogues affected neither the oogenesis nor spermatogenesis in *G. sigillatus*. Since the treated males could as well produce viable sperms as the controls, the finding supports the view that the spermatogenesis may not be under the endocrine control<sup>8</sup>. Further, as the gonadal differentiation in *G. sigillatus* takes place earlier to the adult emergence, the application of JH analogues to the adults may not affect the reproductive organs.

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