developed within 7 days. Reisolations always yielded the same organism in culture.

Drechslera rot

The infection on the fruits of *Citrus sinensis* Osbeck, started as small water soaked lesions surrounded by *chlorotic zone. Gradually* the colour of the diseased regions changed to greyish brown which measured 2–4 cm in diameter. After 7 days the whole of the infected region was seen covered with greyish cottony, fluffy mycelium and yellow drops oozes out of the cracked surface and the rotted fruit gave foul smell.

The isolations on P.D.A. medium repeatedly yielded *Drechslera* in culture which was identified as *D. rostrata* Drechsler (Ellis[3]). Pathogenicity test was confirmed by inoculating the healthy fruits by the method as suggested by Tandon *et al.*[4], and Koch's postulates were fully satisfied. *The culture* has been deposited in the Herbarium Commonwealth Mycological Institute, Kew, England (IMI No. 204325).

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GENETIC SYSTEM AND INTERRELATIONSHIP BETWEEN *SOLANUM RETROFLEXUM* AND *S. NODIFLORUM* OF *S. NIGRUM* COMPLEX

A POLYPLOID complex, such as *Solanum nigrum* L. complex, provides a system in which the process of speciation and mechanism of evolution of higher chromosomal forms can be studied and experimentally demonstrated. The present note deals with genetic system and interrelationship between *Solanum retroflexum* Dun. and *Solanum nodiflorum* Jacq. subsp. *nodiflorum* as indicated by preliminary cytomorphological study of the F_1 hybrids and the amphidiploids obtained by doubling the chromosome number of the hybrids by colchicine treatment (0·20% for 18 hrs).

S. retroflexum and *S. nodiflorum* subsp. *nodiflorum* are the species of *S. nigrum* complex and these were raised from seed supplied by Dr. Allan K. Stoner, Research Horticulturist, United States Department of Agriculture, Beltsville Agricultural Research Center, Beltsville, Maryland (USA). The former species is a tetraploid with $2n = 48$ chromosomes while the latter is a diploid with $2n = 24$ chromosomes. *S. retroflexum* is small with several spreading branches and dull black fruits whereas *S. nodiflorum* subsp. *nodiflorum* is tall and erect bearing several shiny purple fruits which are smaller than those of the former.

The cross-pollinations between the two species were successful only when the higher chromosomal form, that is, *S. retroflexum* was used as female parent. Hundred flowers of *S. retroflexum* were pollinated with pollen of *S. nodiflorum* subsp. *nodiflorum*. The fruit-set was 21·00%. The mean number of seeds per fruit was about 12 and the germination was 10·60%. The F_1 hybrids were erect with thick dark green leaves. They branched profusely and flowered abundantly, but there was no fruit-set either on self- or cross-pollinations among them. The pollen fertility of the hybrids was as low as 1·32%. They were at triploid level with $n = 18$ chromosomes. A detailed comparative account of morphological features of the parents and hybrids is presented in Table I.

TABLE I

Comparison of morphological characters of S. retroflexum, S. nodiflorum *subsp.* nodiflorum *and* F_1 *hybrids*

Characters	*S. retroflexum*	Hybrid (F_1)	*S. nodiflorum* subsp. *nodiflorum*
Habit	Profusely branched and semi-erect	Erect	Erect
Plant height (cm)	38·40	48·80	61·50
Leaf	Ovate	Ovate	Ovate
Petiole length (cm)	1·80	2·05	1·58
Lamina length (cm)	5·83	6·48	7·67
Lamina breadth (cm)	3·10	3·13	3·50
Leaf thickness (μ)	299·62	268·68	241·40
Flowers per inflorescence	3	4	6
Fruits per cluster	2	No fruit-set	5
Fruit colour	Dark black	..	Deep purple
Seeds per fruit	31	..	67
Pollen diameter (μ)	23·83	18·56	19.20
Pollen fertility (%)	83·63	1·32	83·00
Chromosome number (n)	24	18	12

Meiosis was normal in parental species of *S. retroflexum* and *S. nodiflorum* subsp. *nodiflorum*, with 24 and 12 bivalents respectively at metaphase I. The frequency of chiasmata, per bivalent, in the former was 1·84 while in the latter it was 1·20. At metaphase I, in about 61% of the pollen mother cells of the F_1 hybrids, the course of meiosis was highly irregular and the mean pairing of chromosomes, per cell, was $9·40_{II} + 0·60_{IV} + 2·60_{III} + 7·00_{I}$. The pairing of chromosomes was loose. The chiasmata frequency, per bivalent, was 1·08. At anaphase I, in about 60% of the cells the distribution of chromosomes at poles was unequal with several laggards, ranging from 1–6. In 3·89% of the cells, chromatin bridges without fragments were observed. At telophase I, micronuclei were not encountered, but at telophase II, they were recorded in about 31·79% of the cells. Pentads were observed in 22·58% of the cells and one of the microspores was invariably small in size.

Sterility of hybrids due to incompatibility of pairing of parental chromsomes has been of significant value toward an understanding of evolutionary divergence; in spite of several instances where synapsis and asynapsis are controlled by genetic factors. In present study the irregular meiosis and high percentage of pollen sterility are the characteristic features of the hybrids. The irregular meiosis is due to difference in chromosome number of the parental species and due to either the difference in genetic constitution or structural differences between the parental chromosomes, which are too small to be detected cytologically, or the combined effects of both the factors because the chromosomal sterility and genic sterility are not mutually exclusive-both can occur in the same hybrid. The existence of structural differences between the parental chromosomes is supported by loose association of chromosomes together with a low frequency of multivalents and chiasmata, per bivalent, in triploids. The amphidiploids obtained by treating the sterile triploids with colchicine were fertile with $n = 36$ chromosomes and set fruits. A detailed study of meiosis of synthesized hexaploids was not undertaken as an adequate number of flower buds was not available. In triploids even though the genic sterility was existing together with the chromosomal sterility, it might be eliminated partly by doubling the chromosome number. This is due to the fact that the genes affecting synapsis have relatively a large influence on partly homologous chromosomes of the hybrids, but relatively little influence on pairing of the completely homologous chromosomes found in their amphidiploids.

From the aforesaid discussion it may be concluded that *S. retroflexum* and *S. nodiflorum* subsp. *nodifloeum* are distantly related with differences in chromosome number and structure, and these features could have played an important role in hybrid sterility and genetic distinctiveness of the two species.

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DISTORTION MOSAIC—A NEW VIRUS DISEASE OF CHICKPEA IN INDIA

A DISEASE of chickpea (*Cicer arietinum* L.) characterized by leaflet mosaic and distortion, overall growth reduction, delayed flowering, underdeveloped pods and grains, dwarfed root system bearing few small sized nodules was observed on Phule G–1, Chaffa, BDN–9–3, N–59 and JG–897 entries of chickpea grown in Gram coordinated varietal trials at Parbhani. The incidence of the disease varied from 2 to 5%. The present paper constitutes a report on the identification of virus involved in chickpea distortion mosaic (CpDMV) by transmission, physical properties, host range and serological tests.

The disease was transmitted by mechanical means from chickpea to chickpea by conventional leaf rub method, using a sap inoculum prepared in neutral 0·1 M phosphate buffer containing 0·02M DIECA, which produced similar symptoms as observed in the field within 3–4 weeks (Fig. 1). Positive insect transmission was also achieved by use of *Aphis gossypii* Glover after having fasted for half an hour before giving an acquisition feeding of 40–60 seconds on virus infected leaves and transferring it to healthy test plants for a transmission feeding of 4 hours. The virus, however, could not be transmitted through seeds of chickpea collected from virus infected JG–897 chickpea plants.

FIG. 1. Chickpea plants (JG–897) showing the symptoms of distortion mosaic (I = infected, II = healthy).