Short Communication

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POLYTOPIC ORIGIN OF *SOLANUM NIGRUM* L.

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Even though *S. americanum* and *S. villosum* are relatively indisputable progenitors of *S. nigrum* (6X), *S. sarrachoides* could be another putative parent. The variability in *S. nigrum* could be due to the combination of *S. sarrachoides* and or morphological variants of *S. americanum* and *S. villosum* during the formation of triploids.

Key Words : *S. americanum, S. villosum, S. nigrum* (6X), *S. sarrachoides,* polytopic origin.

Solanum americanum is taller (42 cm - 68 cm) than *S. sarrachoides* (18 cm - 32 cm) and is eglandular with umbelliform inflorescence. Pedicels are deflexed in flower but erect in berry. The calyx does not embrace the berry and is small and purplish black but rarely green. *S. sarrachoides* is glandular and pilosulous on both sides of leaves. Inflorescence is a simple cyme with deflexed peduncles in flower but pendulous in fruit. Calyx partially encloses the berry at maturity. The berries are small and greenish brown or black.

Hexaploid *Solanum nigrum* shows morphological variability and, on this basis, two subspecies, namely, subsp. *nigrum* (eglandular) and subsp. *shultesi* (opiz) wess. (glandular) have been recognised (Hawkes and Edmonds, 1972). The Indian samples are of subsp. *nigrum* (Ganapathi and Rao, 1986). Two subsp. have been recognised under *S. villosum* (Hawkes and Edmonds, 1972; Edmonds, 1979a, b; Ganapathi and Rao, 1986) - one is smooth stemmed and pubescent with glandular hairs recognised as subsp. *villosum* and the other is a glabrescent form with eglandular hairs recognised as subsp. *miniatum* (Bernh. ex willd.) Edmonds. Tetraploid taxon growing in India is subsp. *miniatum* (Ganapathi and Rao, 1986). In *S. americanum,* on the basis of vegetative divergance, two varieties were recognised (Edmonds, 1979a) i.e. var. *americanum* (pubescent) and var. *patulum* (L.) Edmonds (glabrescent). *S. americanum* growing in India is the var. *patulum* Edmonds (Ganapathi and Rao, 1986).

Though *S. americanum* (Ganapathi and Rao, 1986) and *S. villosum* (Edmonds, 1979a; Rao, Khan and Reayat Khan, 1976; Tandon and Rao, 1966b) are considered to be undisputed progenitors of *S. nigrum* (Tandon and Rao, 1964; Rao, 1978; Edmonds, 1979a), opinions still vary as to the precise origin of hexaploid *S. nigrum* (Edmonds, 1979a). *S. sarrachoides* could be another possible diploid progenitor of hexaploid *S. nigrum* because of the recognition of morphological extrapolation of *S. sarrachoides* characters like deflexed peduncles subtended by small obvoate leaves in *S. nigrum* Edmonds, 1979a) and similarity in electrophoretic band patterns of seed proteins between the two species (Edmonds and Glidewell, 1977). The close affinity of *S. sarrachoides* with *S. nigrum* was also demonstrated by clustering behaviour of the former during numerical analysis, and it was included in the same major cluster of *S. americanum, S. villosum* and *S. nigrum* (Edmonds, 1979a). On the basis of these observations, Edmonds (1979a) believed that the hexaploid *S. nigrum* is not an autoallopolyploid as suggested by Stebbins (1950).

The origin of hexaploid *S. nigrum* from *S. villosum* and *S. americanum* through amphidiploidy of a sterile triploid has been fully established by earlier workers (Tandon and Rao, 1964, 1966a, 1974; Edmonds, 1979a). Edmonds (1979a) says that it is possible that Stebbins (1950) is right and that *S. nigrum* might still prove to contain four genomes from *S. americanum* in the form of two infraspecific variants (Edmonds, 1979a). If *S. nigrum* contains genomes from two infraspecific variants of *S._americanum,* Edmonds (1979a) prefers to consider it as segmental allopolyploid.

In order to study the relationship of *S. sarrachoides* with *S. nigrum,* hexaploid *nigrum* was crossed with *sarrachoides* using the former as pistillate parent by the senior author and his associates (Rao and Anil Kumar, 1983) obtained several sterile hybrids with very low (2.86%) pollen fertility and irregular meiosis. As many

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as 11 bivalents were recorded in some of the pollen mother cells, which suggest that *S. sarrachoides* or its close diploid relative might have contributed a set of two genomes and subsequently played an important role in origin and evolution of hexaploid *S. nigrum.*

The origin and evolution of *S. sarrachoides* from *S. americanum* could not be ruled out because of their inclusion in the same major cluster along with *S. nigrum* during the numerical analysis (Edmonds, 1979a). To understand the genetic relationship between *S. americanum* and *S. sarrachoides,* several reciprocal crosses were made between them; but all the crosses failed, thereby demonstrating that they are separated by prefertilisation barriers and distantly related.

The variability in hexaploid *S. nigrum* could be due to the combination of *S. sarrachoides* and or different morphological variants of *S. americanum* and *S. villosum* during the formation of triploids which latter evolved to hexaploidy, and subsequently, the addtion of radically new adaptive features through the process of mutation and gene recombination provided the great ecological amplitude to the taxon with a high degree of buffering against the environmental changes.

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