TAXONOMIC EVALUATION

Taxonomic evaluation in the modern perspective is the biological characterisation of a species - the basic unit of taxonomy. But, the concept of a species has undergone changes almost keeping pace with the change of time. The Linnaean (1753) species was mainly characterised by morphological features. Later, the evaluation of such a species was based on the morphogeographical characters. With the advocacy of the theory of evolution by Darwin (1859), the species concept received a new approach. It is seen that the basic criteria of classification as considered by him were morphological characters. Recently, Davis and Heywood (1963) have wisely included all these various definitions of species under two classes: (a) "Taxonomic" (embracing orthodox, morphological, morphogeographical, etc.) and (b) "Biological" (embracing all the new concepts of species).

The "taxonomic" definitions are also called $\alpha$-taxonomy. A rapid change of ideas of orthodox $\alpha$-taxonomy seems to have gained an impetus with the theory of inheritance by Mendel (1865). Thus, according to Emerson (1945), a species is a genetically distinctive, reproductively isolated natural population. On the other hand, Stebbins (1950) is
of the opinion that, species are natural units separated from each other by gaps of genic discontinuity.

The cytotaxonomic approach in determining a species objectively, according to Lawrence (1951), is whether a particular taxon deserves the rank of species or is of interspecific level. Consequently, there appeared experimental taxonomy, wherein the "taxonomic" species were subjected to experimental investigation. Thus, we find the definition or concept of species in a state of controversy. Defining the biological species Valentine and Love (1958) have said that, "an objective criterion of a biological species, something which can be determined by experiments: has a biological meaning in that it marks a certain stage in the process of evolutionary divergence".

Since the last two decades, chemical information on a species has become an important character in the evaluation of a species (Bate-Smith, 1953 and Alston & Irwin, 1959). Davis and Heywood (1963) have stressed the importance of chemical data in understanding the taxonomic relationships. Thus, the modern taxonomy has multidimensional approach, where, morphological, cytological, and biochemical characters are taken into consideration in evaluating a taxon.

As such, all the systems of classification, as Lam
(1959) puts it, must be a compromise, because of the particular selection of characters, the degree of precision and unity with which they can be defined. While evaluating a species in the light of multidimensional concepts, it is likely that there might occur contradictory results. In such a situation, according to Heslop-Harrison (1963) and Davis and Heywood (1963), the morphological characters should be given precedence.

Thus, in the present study also the three aspects of approach viz., morphological, cytological and chemical, are taken into consideration in evaluating the individual species.

**Oberonia falconeri** Hook. f.

This species has been collected from various places of different ecological conditions. Although the collections from Nigadi (Coll.No.1659) were comparatively dwarf, their karyotype and chemical patterns were found to be similar to Coll.Nos. from Castle Rock (1506) and Yellapur (1565). The species is distinctive in having grooved rachis covered by hyaline bracts and simple lip; in possessing simple karyotype; and in displaying GY marker spot with Rf-value (=0.70) and uncommon amino acids with Rf-values (=0.195) and (=0.41). Thus, the species stands as a clear good species.
O. verticillata Wight.

Blatter and McCann (1931) have described a species as *O. spiralis* from Yellapur (Type locality of *O. spiralis* Blatt. & McC.). However, in the revision work by Santapau and Kapadia (1966), it has been shown that there is no difference between *O. spiralis* Blatt. & McC. and *O. verticillata* Wight. Our observation on the fresh specimen from different areas also confirms this view in that, no karyotypic and biochemical variations in the different collections have been observed.

The species is distinct in its karyotypic features having three pairs of satellited chromosomes. Amino acid analysis reveals an "uncommon" amino acid spot Br with Rf value (=0.23). The fact that this species is characterised by GY marker spots with Rf value (=0.37) and (=0.60) further evidences the species to be a distinct entity.

O. brunoniana Wight.

This species was also called *Malaxis brunoniana* (Reichenbach, 1861), *Iridorchis brunoniana* (Kuntze, 1891). However, Hooker (1885) describes this species as *O. brunoniana* Wt., only. The plants are morphologically distinct in having brownish leaves. The morphological features are, quadrate 3-lobed lip with large disc. Karyotypically it can be distinguished by its two gradations of chromosome sizes - one
comparatively longer, and the other comparatively shorter. The presence of GY marker spot with Rf value (=0.34) and of dl-aspartic acid clearly indicate this species to be a clear species.

**O. ensiformis** (Sm. ex Rees) Lindl.

This species is characterised by ensiform leaves, short inflorescence, 3-lobed lip with bristle like hairs on the lobes. The pronounced, 3-lobed condition might have lead to the confusion in identifying this species as **O. trilobata** of Griffith (cf. Santapau and Kapadia, 1966). Karyotypically and biochemically the plants show distinct characters, as mentioned earlier. Thus, the status as a distinct species is unaffected.

**O. santapaui** Kapadia.

This species was earlier referred as **O. lindleyana** Wt. by Wight (in Lindley, 1851). However, Santapau and Kapadia (1966) in their review work have found different names referred to this same species, as **O. lindleyi** and as **O. lindleyana**. Santapau and Kapadia reject the name in accordance with the code of nomenclature and rename it as **O. santapaui** Kapadia. The observation on the fresh material has revealed it to be a distinct species. The study of
cytology and biochemistry of this plant has also revealed the distinct characters of the species.

**O. iridifolia** Lindl. var. *denticulata* Hook. f.

This species seems to have very restricted occurrence in South India. The erect epiphytic habit, erose nature of lateral lobes and the unequal broad sinus are characteristics of the species. Two pairs of chromosomes with secondary constrictions which are almost as big as the short arm are distinguishing features. The distinctive free amino acid pattern with a BP (=0.24) spot and GY flavonoid patterns with (=0.30) and (=0.94) spots establish this taxon as a good species.

**O. brachyphylla** Blatt. and McC.

This species finds a wide range of distribution. These small epiphytic plants are characterised by irregularly denticulate petals, 3-lobed quadrangular lip with slightly divergent sinus. Biochemical pattern especially of flavonoids is very distinctive with its bright GY fluorescence. Karyotypic study also reveals it to be a distinct good species.
**O. proudlockii** King & Pantling.

This species is unique in having thickened rachis, sunken flowers in the rachis and irregularly denticulate margin. Cytologically it is characterised by 13 pairs of short chromosomes out of which one pair of submedian chromosomes is satellited. Free amino acid pattern reveals two Br spots out of which one is found to be l-lysine monohydrochloride. Flavonoid pattern is unique and impressive with its two GY spots. Therefore, this taxon is a clear species.

Blatter and McCann (1931) mention a species, **O. sedgwickii** Blatt. & McC. from Castle Rock. Collecting the specimen from the same type locality, Santapau and Kapadia (1966) are of the opinion that **O. sedgwickii** Blatt. & McC. is identical with **O. proudlockii** of King and Pantling. Our observations done also are in conformity with Santapau and Kapadia (1966) in retaining the name as **O. proudlockii** King and Pantling.

**Malaxis versicolor** (Lindl.) Sant. & Kapadia

The nomenclature of this species is highly controversial. Lindley (1930) describes two species as **Microstylis versicolor** and **M. rheedi**. But, it is seen that his descriptions are
based on Swartz's drawings. Further, he observes that *Microstylis versicolor* seems to be different from *M.rheedi* Sw., basing his postulation on Forster's drawings (cf. Lindley, 1830). There, he mentions that *M.versicolor* is distinct in having greater size and larger leaves. Hooker (1890) also describes two species *Microstylis rheedi* Wight and *M.versicolor* Wight., separately. However, in the footnote, Hooker makes it clear that *M.rheedi* Wight. is unquestionably Rheede's plant, to which the Javaen and Pacific *M.plantaginea* has been erroneously referred (Cf. Santapau and Kapadia, 1966). Therefore, our Indian specimen must be *Microstylis versicolor* Lindl. and in view of existing confusion, Santapau and Kapadia (1966) have legitimatized the name as *Malaxis versicolor* Sant. & Kapadia. We also support them in maintaining the species as *Malaxis versicolor* Sant. & Kapadia.

The species is characterised by petiolate leaves with crimped margin, and the lip with denticulate margin. Biochemical pattern as described earlier also reveals it to be a distinct species. The fact that different collections of this species from different localities have shown karyotypic and biochemical variations in the present study, justifies the proposition of a cytotype which is also a chemotype.
M. densiflora (A.Rich.) O.Kuntze.

The name of this species was also under dispute. Because of its close resemblance with Liparis, it was earlier referred as Liparis densiflora A.Rich. Hooker (1890) does not treat this species as a separate one and mentions it as Microstylis versicolor only. In the Flora of Presidency of Madras (Gamble, 1928), this species is found described as Microstylis densiflora. However, Santapau and Kapadia (1966) describe this plant as Malaxis densiflora O.Kuntze.

The species is characterised by sessile, plicate leaves and 3-lobed lip with smooth margin. Further, the species is distinctive cytologically in possessing 21 pairs of short chromosomes of which 3 pairs are sat-chromosomes. The fact that the species displays Malaxis pattern of flavonoid spot pattern, justifies it as a species of Malaxis and cannot be treated under Liparis. Thus, the plant is a clear species.

Liparis prazeri King. & Pantling.

Blatter and McCann (1931) report a species - L. flavo-viridis which was later reexamined by Santapau and Kapadia (1966), according to whom L. flavo-viridis of Blatter and
McCann (1931) is nothing but *L. prazeri* King. & Pantling to which legal name they adhere.

The species is characterised by plicate sessile leaves with prominent 7-nerves and dark-green clawed lip. It is also distinct cytologically and biochemically as well. Thus the taxon can be considered as a distinct good species.

*L. nervosa* (Sw.) Lindl.

This species finds wide distribution, in India, Burma, Nepal and Japan. The species can be readily distinguished by the basal portion of the lip running parallel to the column and the apical part of it deflexing. The karyotype is distinguished by a pair of sat-chromosomes and comparatively longer sized chromosomes. Biochemically it is distinct in having B, GY and R flavonoid marker spots. Obviously this taxon is a good species.

*Sarcanthus peninsularis* Dalz. shows a clear status with its somatic number 2n = 38 and with its typical karyotype. The presence of B(=0.25) and P(=0.48) free amino acid spots and YB(=0.67) and B(=0.89) flavonoid spots further typify the species. Thus, the species is a distinct entity.
Cottonia peduncularis Reich, is the only species in the genus and is distinct in the karyotypic features like 4 pairs of sat-chromosomes out of which three have SATs on the long arm. The biochemical spot pattern is unique in possessing B and RBr spots. Hence, it forms a clear species.

Gastrochilus dasypogon (Sm. ex Rees) O.Kuntze. can be distinguished from its related members by its fimbriate lip. The species was earlier referred as Saccolabium dasypogon. However, it is seen that O.Kuntze has transferred Saccolabium dasypogon Lindl. to Gastrochilus dasypogon (Cf. Santapau & Kapadia, 1966).

The species has a wide range of distribution. Sharma and Chatterji (1966) and Tara and Kamemoto (1970) have reported the somatic number for this species as 2n = 38. However, our findings of this number varies from 2n = 38 to 2n = 40. This change obtained in the chromosome number may be attributed to the changes in locality of South India. The flavonoid spot pattern with Br spots distinguishes this genus Gastrochilus from the rest of the genera. Thus, G. dasypogon may be considered as a clear good species.