TAXONOMY OF THE GENUS *APLUDA* L.

From the time of Linnaeus, the taxonomy of the genus *Apluda* has been much discussed. Hooker (1897) placed it in a separate subtribe Apludeae of the tribe Andropogoneae. Similarly, Stapf (1917) gave it the rank of a separate subtribe Apludastrae in the Andropogoneae, while Pilger (1940) placed it in the subgroup Apludinineae of the subtribe Ischaeminae. In this genus, normally, the unit of the inflorescence is a one noded triplet of spikelets. This unit consists of a sessile hermaphrodite spikelet, a pedicel carrying a male spikelet and a pedicel crowned by a minute rudiment, the whole seated upon a peduncle which starts from a spathe (Bor, 1960). In some of the units on the other hand, the pedicelled male has been transformed into a triplet so that there is a fertile spikelet, flanked by a rudimentary pedicelled spikelet, while the pedicel of the normal male spikelet becomes an internode crowned by a sessile fertile, flanked by two pedicelled spikelets one of which is male and another rudimentary. The result of this is that instead of the normal triplet of spikelets, one gets a partial raceme on the usual plan of the false raceme in the Andropogoneae. The occurrence of these 2 noded spikelets suggests its relationship with the other Ischaeminae, all of which have racemes with more than one node. But the peculiar bulb like swelling at the base of the triplet of spikelets is so characteristic of the genus *Apluda,* that its place as a separate subgroup in the subtribe Ischaemineae is well justified.

By far, the real controversy lies in the delimitation of the species. The genus has been considered as very polymorphic and unstable (Hooker, 1897 ; Stapf, 1917). Linnaeus (1753) described the unawned form of this grass under the name *Apluda mutica* L., but, subsequently (1756) he felt that the awned form is a distinct species and named it *Apluda aristata* L. Since then it has puzzled a good number of systematists, because of the 2 states in which it is found *viz.*, awned and awnless. Hackel (1889) solved this difficulty by giving the plant a new name, *Apluda varia,* of which he had 2 subspecies, subsp. *aristata* Hack. and subsp. *mutica* Hack. both of which he divided into varieties and subvarieties (Bor, 1960). Pilger (1940) recognized a single species, *Apluda mutica* L. comprising 2 varieties, variety *mutica* (awnless) and variety *aristata* (awned). Bor (1960) considered that there will be no useful purpose in the present state of our knowledge in maintaining Hackel's varieties as these varieties pass into one another by numerous intermediates and suggested that a thorough investigation using the methods of experimental taxonomy is needed in the genus.

Murty (1965) reported 3 chromosomal races *viz.*, diploid ($2n = 20$), hexaploid ($2n = 60$) and heptaploid ($2n = 70$). Studies of gross morphology (Murty 1972a), meiotic behaviour (Murty 1972b) and pachytene chromosome morphology (Murty 1972c) indicated inter-varietal polyploidy in the genus. All the forms included in Murty's studies are awned and hence are referable to the subspecies *aristata* of Hackel (1897) or to the variety *aristata* of Pilger (1940). Following Hackel, Hooker (1897) classified the awned Indian varieties of "this very unstable and highly polymorphic plant" into 4 varieties: 1. var. *aristata* Hack, 2. var. *ciliata* Hack, 3. var. *villosula* Hack and var. *rostrata* Hack.

The criteria which Hackel used in his classification are: 1. length of the spathe in relation to the length of the spike, 2. length of the sessile spikelet in relation to the length of the terminal spikelet, 3. length of the bulbous base, 4. hairiness of glume I and 5. degree of incurving of the spike.

It has not been possible to distinguish the three cytological races included in Murty's

(Murty 1968) study into distinct varieties on the basis of these criteria. Further more, the characters were observed to vary in progenies raised from selfed or open pollinated seed of a single plant. Variation in respect of these characters in the progenies of the diploids and polyploids was rather continuous and the range of variation was the same for all the three cytological races, rendering it difficult to refer these races to any of the 4 varieties of Hackel. Morphological study of the diploid suggests that the possibility of introgression between sympatric populations of morphologically distinct subspecies or varieties cannot altogether be ruled out (Murty, 1968). Another possibility is that the diploids are products of introgressive hybridization, possessing a greater adaptive advantage, compared to their ancestors, which might have become extinct or the existence of which can be revealed only by an extensive collection of the genus from the entire area of its geographical distribution. Alternatively, it may be that polyploidy and the characteristic breeding systems associated with the diploids and the polyploids alone might have been responsible for the high variability and polymorphism observed by systematists who worked on the genus (Murty, 1972b).

As will be reported elsewhere the genus exhibits intervarietal autopolyploidy and such cases of polyploidy pose major problems to the taxonomist. Davis and Heywood (1963) have reviewed several examples of autopolyploids (using the term loosely), which can be divided into cryptic, semicryptic and distinct, with the consequent taxonomic status accorded to them ranging from no formal recognition at all, to the rank of distinct species. In the present study about 600 specimens of the genus were observed in the Central National Herbarium (Calcutta, India), collected from China, Japan, Pakistan, India, Burma, Ceylon, Philippines, Java, Malaya and Australia. The various specimens exhibited striking variations in respect of the size of the vegetative and floral parts. But the variation was not discrete to enable any convenient classification. All of them, however, can be classified into two groups, those with awns and those without. No other differences were found to be consistently associated with this character. Though, length of the awn also varied between extremes, awnless and awned forms could be made out rather easily.

From the above discussion, it appears that the only practicable solution would be to recognize a single highly variable species with two varieties *viz.*, awned and awnless. In general, this system is in accordance with that adopted by Bor (1960) and in particular, with that of Pilger (1940).

Even from the biosystematic point of view, or biological species concept (Love, 1964), since the diploid easily crosses with the polyploids (when the latter are used as the male parents) and the hybrids are seed fertile (Murty 1968) it is not possible to assign the ranks of specific taxa to the three cytological races, even in the absence of information as to the occurrence or non-occurrence of any "prezygotic isolation mechanisms"

1. **Apluda mutica** L. var. **mutica** Pilger in Natl. Pflanzenf. 14e: 130. 1940. *A. mutica* L. Sp. Pl. ed. 1: 82. 1753. *A. geniculata* Roxb. Fl. Ind. 1: 327. 1820. *A. gigantea* Spreng. Syst. Veg. 1: 290. 1825. *A. humilis* Kunth Enum. Pl. 1: 517. 1833. *A. mucronata* Steud. Syn. Gram. 404. 1855. *A. inermis* Regel. in Act. Hort. Petop. 7: 658. 1880. *A. varia* subsp. *mutica* Hack. in DC. Monogr. Phan. 6: 196. 1889. *Andropogon glaucus* Retz. Obs. Bot. 5: 20. 1789. *Calamina gigantea* (Spreng.) P. Beauv. Ess. Agrost. 128. 1812. *Calamina humilis* J.S. Presl. ex C. B. Presl. Rel. Haenk. 1: 344. 1831.
2. **Apluda mutica** L. var. **aristata** (L.) Pilger. in Natl. Pflanzef. 14e: 130. 1940. *A. aristata* L. Amoen. Acad. 4: 303. 1756. *A.*

gryllus Beauv. Agrost. 133 (cf. Corrigend. in suppl.) 1. 23, f. 5. 1812. *A. microstachya* Nees in nov. Act. Nat. Cur. 19 suppl. 1: 194. 1843. *A. scabra* Anderss. in Ofvers. K. Vet-Acad. Forh 179. 1856. *A. ciliata* Anderss. in Ofvers. K. Vet. Acad. Forh 177-179. 1856.

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NEW RECORDS OF FLOWERING PLANTS FOR KASHMIR—I

A perusal of the literature revealed that the following species of flowering plants, which were collected by the author from different parts of Kashmir valley, are hitherto not recorded from Kashmir. Three of the reported genera *viz., Lactuca, Lathyrus* and *Euphorbia* have been treated in detail for Kashmir species in Blatter's "Beautiful Flowers of Kashmir" (1927-28), yet the species belonging to these genera and reported below do not occur there in, or in any other work dealing with Kashmir plants. The voucher specimens are deposited in the Herbarium of Kashmir University, Srinagar.

Linum strictum L. subsp. **corymbulosum** (Reichenb.) Rouy, Fl. Fr. 4: 60. 1897; Ockendon & Walters in Flora Europaea 2: 210. 1968. *L. corymbulosum* Reichenb. Fl. Germ. Excurs. 843. 1832; Boiss. Fl. Orient. 1: 852. 1867. *L. strictum* L. var. *corymbulosum* (Reichenb.) Planch. in Hook. Lond. Journ. Bot. 7: 476. 1848; Hook. f. Fl. Brit. India 1: 411. 1874.

Flowers: May-June.

Locality: Mountain slopes around Manasbal lake, *Gurcharan Singh* 4011. Fairly common.

Lactuca runcinata DC. in Wight, Contrib. 26. 1834. 1962. *L. heyneana* DC. Prodr. 7: 140. 1838; Hook. f. Fl. Brit. India 3: 403. 1881.

Flowers: May-July.

Locality: Pampore saffron fields, Kashmir, *Gurcharan Singh* 3267; Kashmir University campus, *Gurcharan Singh* 2541a.

Lathyrus sphaericus Retz. Obs. 3:39. 1785; Baker in Hook. f. Fl. Brit. India 2:180. 1876.

Flowers: May-June.

Locality: Harwan among shrubs, *Gurcharan Singh* 2217; Dachhigam forest among shrubs, *Gurcharan Singh* 3370a.

Crambe cordifolia Stev. var. **kotschyana** (Boiss.) O. E. Schulz in Engl. Das Pflanzenreich Heft 70: 236. 1919. *C. cordifolia* Hook. f. & Anders. in Fl. Brit. India 1: 165. 1872 (non Stev.).

Flowers: April-May.