

GENUS *Pycreus* P. VEAUUV. (CYPERACEAE) IN EASTERN UTTAR PRADESH, INDIA**VINAY KUMAR^{a1}, RUPESH KUMAR VISHWAKARMA^b AND MASOOD AKHTAR^c**^{abc}Shibli National P.G. College, Azamgarh, U.P., India**ABSTRACT****Detailed taxonomic account of 6 spp. and two varieties of the genus *Pycreus* P. Beauv. found in Eastern Uttar Pradesh & Key to the species are provided.****KEYWORDS :** *Pycreus*, Eastern Uttar Pradesh, Taxonomic

Eastern Uttar Pradesh lies between 23°51' N to 28°30'N and 81°31'E to 84°39'E covering an area of about 85,298km², and segmented into 27 districts. The area falls under Gangetic Plains and covers forest area of Terai & Bhabhar tract, cultivated areas of Purvanchal, etc. But the flora of the region is not yet worked out. Present study deals with the floristic diversity of the genus *Pycreus* P. Beauv. in the Eastern U.P. The study is based on the field observations, scrutiny of literature, (Duthie 1929, Hooker 1893; Srivastava et al., 1987) and herbarium specimens housed in LWG, DD, BSA, BSIP, GU, (Herbarium at Gorakhpur University) DUTHIE (Allahabad University) herbaria.

MATERIALS AND METHODS

A check-list of the species recorded earlier from the area under study was prepared after scrutiny of the literature and specimens housed in Indian herbaria viz. DD, BSA, DUTHIE, LWG, and other herbaria at Universities etc. field explorations were conducted and processed, following standard herbarium techniques. The collected specimens were identified, with the help of relevant flora and other taxonomic literature.

The descriptions were made prepared after critical study of the specimens. In present study, the systems of Bentham & Hooker (1862-1883) was followed with some changes. Efforts were made to bring the nomenclature up to date as per provisions of ICN (Earlier Known as ICBN).

Methods of Collection

Regular excursions were arranged to cover entire area during different seasons. Observations on the habit/habitat, flower colour, fruiting, seeds, including other features of interest were recorded and photographed on spot.

The specimens were carefully selected before pressing and following points were taken to note of-

1. Underground parts like root, rhizome etc. are intact included in herbs.
2. It was made sure that specimens are in flowering or fruiting condition.
3. It was ensured that specimens are free from fungal infection, insect feeding and other pathological symptoms.
4. As a general rule single specimen was pressed in folded pressing paper. In case of large-foliage specimens, it was cut into two or more pieces and each piece were arranged and pressed into two or more folded pressing papers.
5. To avoid discoloration and molding, blotters were changed frequently depending upon nature of specimen and humidity levels.

In rainy seasons when the atmosphere was humid, the wet materials were preserved by solution of formaldehyde and alcohol containing one part of formaldehyde and two parts of 70% alcohol. The solution was applied to the specimens with a 56cm flat brush instead of dipping.

Identity of the specimens was verified from BSA, LWG herbaria CAL and literature. The nomenclature of plants was updated from the recent available literature. The herbarium specimens were deposited in Department of Botany, Shibli National (P.G.) College, Azamgarh, herbarium (HSNCAZH).

RESULTS AND DISCUSSION***Pycreus* P. Beauv**

Fl. Oware & Benin 2: 48. t. 86. 1807.

Type: *Pycreus polystachyos* (Rottb.) P. Beauv. (*Cyperus polystachyos* Rottb.)¹Corresponding author

Annual or perennial sedges, sometimes rhizomatous or stoloniferous. Culms not nodes above the leafy base, solid. Leaves 3-ranked with gramineous blade, or becoming subaphyllous sheath by the reduction of the blade. Spikelets laterally flatended with few to many glumes districhously disposed on a continuous rhachilla, prophyllate at base. Glumes all alike, as a rule bearing a hermaphrodite flower at the axil, often with nerveless sides. Flowers with digynous pistil, 1 or 2 (rarely 3) stamens; hypogynous bristles absent. Achenes bilaterally flattened, with one angle facing the rhachilla; styles 2-cleft.

About 70 species in temperate, tropical and subtropical parts of the world, with high specific concentration in Africa; 6 species in Eastern Uttar Pradesh.

Key to the species

- 1a. Spikelets digitate; glumes mucronate-aristate, 1-1.5 mm long. Nuts ca 0.5 mm long *P. pumilus*
- 1b. Spikelets spicate; glumes muticous-mucronulate; glumes and nuts frequently larger.....2
- 2a. Epidermal cells of the nut longitudinally stretched, linear-oblong; nuts wrinkled by wavy or broken transverse lines.....3
- 2b. Epidermal cells of the nut isodiametric, roundish or hexagonal; nuts not wrinkled.....4
- 3a. Spikelets linear, ca 2 mm broad, suberect even in fruit; glumes ca 2 mm long, mucronulate, stramineous-yellowish..... *P. stramineus*
- 3b. Spikelets oblong-lanceolate, 3-4 mm broad, finally spreading; glumes 2.5-3.5 mm long, muticous, fulvous, castaneus or purplish *P. diaphanus*
- 4a. Stems mostly decumbent and rooting at the lower nodes. Leaves at the base of the stem and a few upward also. Spikelets oblong; glumes broadly ovate, with acute keel, and usually with a depression on either side. Nuts obovate-suborbicular..... *P. sanguinolentus*
- 4b. Stem always erect. Leaves only at the base of the stem. Spikelets linear-lanceolate; glumes oblong-lanceolate with straight keel, without any depression on the sides. Nuts linear-oblong or narrowly obovate.5
- 5a. leaves flat. Spikelets gradually tapering to an acute apex; rhachilla narrowly winged; glumes acute. Nuts linear oblong subtruncate at the top..... *P. polystachyos*
- 5b. Leaves canaliculate. Spikelets parallel-sided;

rhachilla wingless; glumes obtuse. Nuts elhptic-narrowly obovate, not truncate. *P. flavidus*

- 1. ***Pycreus diaphnus*** Schrader ex R. & S., var *latespicatus* (Boeck.) Kern in Fl. Males. (Ser. 1) 7(3) : 653, 1974. *Cyperus latespicatus* Boeck., Flora 42 : 441 (433) 1859. *Pyrecus latespicatus* (Boeck) Clarke in Hook. f. Fl. Brit. India 6 : 590, 1893 at Ill. Cyp. t. 3, 1909.

Annuals. Stems tufted, rigid, trigonous, 10-40 cm high, Leaves flat, gradually narrowed upwards, 1-2.5 mm wide. Inflorescence simple, often contracted, sometimes with 2-3(-5) rays up to 7 cm long, or reduced to a single head. involucre bracts 2-3 (4) patent, the lowest up to 15 cm long. Spikes broadly ovate; rachis short up to 5 mm, spikelets finally horizontally spreading, approximate, oblong, with nearly parallel margins, strongly compressed, sub-obtuse, 10 - 20 mm x 2.5 - 4 mm, 20-30 (-40)-flowered; rachilla slightly flexuous, wingless, persistent; intemodes ca 0.5 mm. Glumes membranous, obliquely patent, keeled, ovate, obtuse, muticous, about 2/3 imbricate, 2.5 - 3 x 1.75 - 2 mm; keel curved, green, 3(-5)-nerved; sides nerveless, shining fulvous to castaneous, margins somewhat undulate. Stamens 2; anthers oblong to oblong-linear, 0.75-1 mm. Styles up to 1.5 mm; stigmas 2, about as long as the style. Nut biconvex, laterally compressed, obovate to broadly obovate' or elliptic, broadly stipulate, apiculate, 1-1.25 by 0.8-1 mm, rugulose with transverse wavy lines, ultimately black, epidermal cells longitudinally oblong.

Notes : This species resembles *Cyperus uniolooides* but readily distinguished by the 2 stamens (3 in *Cyperus uniolooides*) and the rugulose nut.

Fl. & Fr. : Aug.-Oct.

Habitat: near streams (nala), wet lands and paddy fields.

Distrib. : India : Kumaon to Khasi, Bengal, Chota-Nagpur, Malabar.

Eastern Uttar Pradesh: Lucknow, Jaunpur.

Specimens examined Lucknow : Govt. Reserve forest, Umashankar, 1019 (LWG!).

- 2. ***Pycreus flavidus*** (Retz.) Koyama in Journ. Jap. Bot. 51(10) : 313. 1976, at in Dassan., Rev. Handb. Fl. Ceylon 5: 222. 1985. *Cyperus flavidus* Retz., Obs. Bot. 5: 13. 1788, non sensu C.B. Clarke in Hook. f, Fl. Brit. India 6 600. 1893; *Cyperus globosus* Allion., Fl. Pedem. Auct. 49. 1789, non Forssk. 1775. *Cyperus capillaris* Koenig ex

Roxb., Fl. Ind. I : 198. 1820. *Cyperus strictus*., Roxb.,- Fl. Ind. I : 203. 1820, non Lam. 1791. *Pycreus globosus* (Allion.) Reichenb., Fl. Germ. 'Excurs. 2:140. 1830. *Pycreus capillaris* (Koenig ex Roxb.) Nees (Linnaea 9 : 283. 1834 comb. invalid.) ex C.B. Clarke in Hook. f., Fl. Brit, India 6 : 691. 1893, pro part. excl. var nfigiricus (Hochst. ex Steud.) C.B. Clarke.

Type: India, Tranquebar, Koenig.

Erect, annual herbs. Stems trigonous, cespitose. Leaves subbasal, rigid, linear, filiform, as long as or shorter than stems, 1-2 mm broad; sheaths with a truncate mouth. Umbel compound, spikes dense, short-linear, sometimes several rays and a central, sessile, subglobose spike; rays short, upto 5 cm long; bracts 2-3 upto 15 cm long; spikelets pale brown, linear or lanceolate, compressed, many-flowered, 6-10 mm long; glumes chartaceous, ovate or ovate-oblong, closely imbricate, keeled; stamens 2, anthers small, mucous, ovary one celled style 2 mm long 2 fid. Stigma 2, as long as or longer than styles. Nuts biconvex, ellipsoid, compressed, apiculate, chestnut brown to black, ca 1 mm long.

Fl. & Fr. : July-Nov

Habitat: in marshy places, water-sides, cultivated fields. Common.

Distrib.: S. Europe, Africa, W. & C. Asia, India, China, Japan, Malaysia.

Eastern Uttar Pradesh: Allahabad, Azamgarh, Gonda, Jaunpur, Lucknow, Mirzapur, Sultanpur.

Specimens examined: Allahabad : Garwa, B.K. Mishra, 73 (DUTHIEI); Shankargarh, R.K.S. Chauhan, 519 (DUTHIE). Azamgarh : Naraipur, S.N. Srivastava, 14370 (GU); Bilariyaganj, Chandra, 5743 (GU). Gonda : s.l., Inayat, 222857/a (CAL!). Lucknow : Banthara, Ravi Ahuja, 1171 (LWG!). Sultanpur: Kurebhar, Om Prakash, 10171 (GU); Belhari, Om Prakash, 10189 (GU).

3. *Pycreus polystachyos* P. Beauv. Fl. de Oware 2 ! 48. t. 86. f. 2. 1807. *Cyperus* var. *polystachyos* Rottb. Descr. et Icon. 39. t. 21. f. 1. 1773.

Annual or sometimes perennial, tufted, 10-70 cm high. Stems slender or rigid, compressed-trigonous, 1-2 mm thick (sometimes almost absent). Leaves 6-9, half to three-fourth as long as the stem, 2-4 mm broad, greyish green. Anthela compound, evolute or capitate contracted;

bracts 3-6 foliaceous, lowest 3.5-20 cm long; rays 1-7, longest up to 4 cm long; spikelets numerous, congested, suberect to spreading, linear, 8-25 x 1.5 mm, 16-50 flowered; rachilla flexuous, narrowly winged; membranaceous, rather remote, ovate-lanceolate, 1.5-2 mm long, mucous or mucronate, keeled, stramineous or pale ferruginous (rarely castaneous). Stamens 1-2; anthers ca 0.5 mm long, crest ovate; styles deeply bifid. Nuts linear-oblong, lenticular, with almost truncate shoulders, 1 - 1.2 mm long, apiculate, brown or ultimately glossy black.

var. *laxiflorus* Benth., Fl. Austr. 7 : 261. 1878.

Pycreus polystachyos var. *laxiflorus* Clarke in Hook. f., Fl. Brit. India 6 : 592. 1893.

Stems longer. Anthela lax; rays 6-10; spikelets remote, the lower often spreading; glumes ferruginous.

Fl. & Fr. : July

Habitat: in paddy-fields.

Distrib.: India : Assam, Uttar Pradesh: Basti.

4. *Pycreus pumilus* (L.) Nees (Linnaea 9 : 283. 1835, comb. invalid) ex C.B. Clarke in Hook. f., Fl. Brit. India 6 : 591. 1893, pro part. quoad basion., excl. syn. at descr.; 948; *Cyperus pumilus* L. in Torner, Cent. Pl. 2: 6. 1756, et Sp. Pl. ed. 2. 1 : 69. 1762. *Cyperus nitens* Retz., Obs. Bot. 6 : 13. 1791. *Pycreus nitens* (Retz.) Nees in Nova Acta. Acad. Caes. Leop.-Carol. Garman. Nat. Curr. 19. Suppl. 1 : 53. 1843; C.B. Clarke in Hook. f., Fl. Brit. India 6 : 591. 1893. ssp. *pumilus*.

Small, erect, annual herbs. Stems obscurely trigonous. Leaves basal, shorter than or as long as stems, 1-2 mm broad, acute-acuminate, scabrid in upper part. Umbels simple or compound or reduced to single, head; bracts 3-5, overtopping rays, foliaceous; spikes ovoid or sub-globose, dense, 1-2 cm across spikelets clustered or short-spicate, strongly compressed, linear or linear-lanceolate, divergent pale brown or straw-coloured, 5-10 mm long; rachilla slender, persistent; glumes membranous, ovate, sharply keeled, 3-5 veined not exposing the achenes; stamen 1, occasionally 2, anthers oblong; ovaries 1-celled; styles slender, ca 1 mm long; bifid; stigmas 2, about as long as style. Nuts obovoid, laterally compressed, retuse apiculate at apex, brown, 0.4-0.7 mm long.

Fl. & Fr.: Oct.-July

Habitat: in moist grass places, In ditches, muddy situations.

Distribution: Nepal, India, Thailand to Vietnam, Malaysia. Eastern Uttar Pradesh : Allahabad, Azamgarh, Bahraich, Banda, Barabanki, Ghazipur, Gorakhpur, Lucknow, Mirzapur, Sultanpur.

Specimens examined

Allahabad Saiyad Sarawan, B.K. Mishra, 780 (DUTHIE); Ramnathpuram, B.K. Mishra, 599 (DUTHIE); Hanumanganj, B.K. Mishra, 626 (DUTHIE); Garwa, B.K. Verma & R.P. Dube, 549 (DUTHIE). Azamgarh : Mahula, S.N. Srivastava, 14624 (GU); Gambhirpur, Chiandra, 5611 (GU). Bahraich : Abdullaganj, O.P. Mishra, 6402 (BSA). Fatehpur : Kishanpur, S.K. Dixit, 2248 (DUTHIE). Ghazipur : Udanti river, S.D. Singh, 12498 (GU). Gorakhpur : Narhilake, A.K. Srivastava, 7221 (GU); Padri Bazar, T.N. Srivastava, 1122 (GU). Jaunpur (cf S.K. Singh & Dixit 1969). Lucknow Kukrail forest, U.S. Mishra, 12949 (LWG); Malihabad, U.S. Mishra, 4785 (LWG); Barabanki road, L.D. Deo & U.S. Mishra, 10 (LWGI); NBG, S.L. Kapoor, 24035 (LWG); Avaran forest, Ravi Ahuja, 1195 (LWG). Mirzapur : s.l., J.G. Srivastava, 21592 (LWG); Sultanpur: Kaaba, Om Prakash, 10302 (GU); Ratanpur, Om Pmkosh, 10181 (GU).

5. *Pycrus sanguinolentus* Nees in Linnaea 9 : 283. 1 ' 834; Clarke in Hook. f. Fl. Brit. India 6 590. 1893. *Cyperus sanguinolentus* Vahl, E num. Pl. 2: 354. 1806. ssp. *sanguinolentus*

Annuals or perennials, 6-90 cm high. Rhizomes, when present, short or sometimes creeping to 15 cm, ca 2 mm thick. Stems erect or decumbent at the base, compressed trigonous, 1-2 mm thick. Leaves several clustered at the base and a few also scattered upwards up to middle of the stem, shorter than to equalling the stem, 1.5-4 mm broad. Anthela evolute or capitately contracted; bracts 2-5 foliaceous, spreading, lowest 5-20 cm long; rays, when present, 1-3, suberect, usually 1-2 cm, sometimes up to 4 cm long; spikelets congested, 3-21 together, diverging, ovate or oblong-lanceolate, compressed, 5-26 mm long, 2-3 mm broad, 840-flowered; rhachilla wingless; glumes subclaxly imbricating, ovate, 2.2-2.5 mm long, obtuse, with a distinct depression and a marginal sanguineous band on both sides; keel green, 3-5nerved. Stamens 3; anthers ca 0.5 mm long; styles 1.5-2 mm long, bifid. Nuts broadly obovoid to suborbicular, 1.1-1.3 x 0.8-1 mm, apiculate, blackish-

brown.

var. *miconux* (Clarke) Kukenth. in Engf. Pflanzenr. heft 101 : 367. 1936. *Cyperus eragrostis* var. *miconux* Clarke in J. Linn. Soc. (Bot.) 21 : 59. 1884.

Glumes ca 2 mm long, cinnamomeus-fugcous. Styles ca 3 mm long. nuts smaller, ca 0.5 mm long.

Fl. & Fr.: April-Jan.

Habitat: in wastelands and river-banks, on moist sandy, sandy loam or clayey soil; a common. weed in paddy-fields. Common.

Distrib. : Arunachal Pradesh (Subansid; Assam : Goalpara; Kamrup; Nowgong. Meghalaya) K & J. Hills.

Eastern Uttar Pradesh: Gorakhpur; Sultanpur.

Specimens examined: Gorakhpur : Deibhar, A.K. Srivastava, 7055, (GU). Sultanpur : Akhandnagar, Om Prakash, 10981 (GU).

6. *Pycrus stramineus* C.B. Clarke in Hook. f., Fl. Brit. India 6 : 589. 1893. *Cyperus substramineus* Kuekenth. in Engl. Pflanzenr. heft. 101 : 398 1936. *Cyperus stramineus* Nees in Wt., Contr. Bot. Ind. 74. 1834; non Desi ex Link, 1820.

Annuals, tufted, 5-32 cm high. Stems slender subtrigonus. Leaves 3-5, shorter than to equalling the stem, 1.5-2 mm broad. Anthela simple, contracted or evolute; bracts 2-3, foliaceous, suberect, lowest 5-7 cm long; rays 1-3, longest 0.5-1.5 cm long; spikelets 2-6 together, suberect, linear, compressed, 8-35 x 2 mm, 14-80-flowered; rhachilis broad, wingless; glumes closely imbricating, ovate, 2 mm long, mucronul ate, stramineus; keel 3-nerved; margins hyaline. Stamens 2, anthers ca 0.6 mm long, crest ovate, red; styles long, deeply bifid. nuts obovoid, lenticular, 1-1.2 mm long, apiculate, blackish brown, with whitish transversely undulating lines.

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