A SYSTEMATIC STUDY OF COMMELINACEAE OF BIHAR AND JHARKHAND STATES, INDIA

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(Date of Receiving-11-04-2021; Date of Acceptance-21-06-2021)

ABSTRACT
The members of the family Commelinaceae are commonly distributed in the tropical and sub-temperate regions of the world. The present study reveals that 25 species under 7 genera of the family Commelinaceae are distributed in Bihar and Jharkhand states. The dominant genera are Commelina, Murdannia and Cyanotis. Out of 26 taxa, 16 are common, one is rare and one is endemic. Few species are ethnomedicinally important and some are ornamental garden plants. The updated nomenclature of each species, local names (if any), phonological data, distribution in the states, ecological status, local uses (if any) are also provided herewith.

Keywords: Commelinaceae, Systematic study, Bihar, Jharkhand.

INTRODUCTION
The Bihar state encompasses a geographical area of 94,162 km² and is situated between 24°15’N – 27°31’N and 85°20’E - 88°18’E. The state is surrounded by the states like Jharkhand, Uttar Pradesh, West Bengal and the country Nepal. Jharkhand is situated between 22°00’N–24°15’N and 83°20’E-87°55’E and covers a geographical area of 79,714 km². Again, the state Jharkhand is surrounded by the states like Bihar, Uttar Pradesh, Chattishgarh, Orissa & West Bengal. Geologically Bihar was formed mostly of deposits of Quaternary-Holocene Age. The chief constituting materials are alluvium mixed with soil separates like sand, silt and clay. The region experiences monsoon climate throughout the year with seasonal variation. The study area is characterized by Alluvial soils mostly in Bihar while in Jharkhand there are extensive areas under Red soils with pockets of Laterite soils. The vegetation of the states is mainly tropophilous.

A number of botanists explored the erstwhile Bihar from time to time since 1848 owing to its rich vegetation and floristic diversity. J.D. Hooker (1872-1897) made collections in the Parasnath hills. Anderson (1863) published an account of the Flora of Bihar based on the collections of his own. He was followed by other workers like Clarke (1884), Wood (1906), Haines (1910, 1919), Burkhill (1910), Carter (1917) and Thomson (1917). Haines (1921-1925) did a pioneering work by publishing a monumental work entitled, “The Botany of Bihar and Orissa”. Later, a number of other botanists like Mooney (1941, 1944, 1950), Bressers (1951), and others extensively surveyed various areas of the state and made significant contributions on the flora of Bihar. Besides, a few workers also worked out the flora of some districts like Ranchi (Bressers, 1951), West Champaran (Bhattacharyya and Sarkar, 1998), Hazaribagh (Paria and Chattopadhyay, 2000 & 2005) and Palamau (Sharma and Sarkar, 2002). Several plant species were recorded from states by many authors from time to time. The present paper is an attempt to know the systematic status of plants under the family Commelinaceae of Bihar and Jharkhand states.

MATERIALS AND METHODS
The present work is based on careful scrutiny of published literatures and study of herbarium specimens deposited at Central National Herbarium, Calcutta (CAL) and herbaria of different colleges and universities in Bihar & Jharkhand States. The paper presents correct name of species with their respective families, phenological data, ecological status and the reported distributions. The flowering and fruiting seasons (Fl. & Fr.) are mentioned in months. Local uses in some cases are also stated. Local names and distribution are abbreviated as Loc. name and distrib. respectively in the text.

OBSERVATIONS
The following species under the family Commelinaceae found in the area are presented:

KEY TO THE GENERA
1. Fertile stamens 3, staminodes 1-3
   2. Cyme solitary, enclosed in a spathaceous bract............................1. Commelina
   2. Cyme paniculate, not enclosed in a spathaceous bract.......................4. Murdannia
1. Fertile stamens 6, or rarely 5, staminodes absent
3. Flowers enclosed within the inflated leaf sheaths ..........................6. Tonningia
3. Flowers not enclosed within the inflated leaf sheaths
4. Petals united below in a tube
5. Flowers enclosed in the biseriate imbricating bracts, sepals free .........................................................2. Cyanotis
5. Flowers not enclosed in the biseriate imbricating bracts, sepals united .............................................7. Zebrina
4. Petals free
6. Flowers in terminal panicle, sepals densely pubescent, ovary 2-celled .....................................................3. Floscopa
6. Flowers in axillary cyme, sepals glabrous, ovary 3-celled........5. Rhoeo


Key to the species
1. Two anterior cells of the ovary 2-ovuled, one posterior cell 1-ovuled
2. spathe cucullate, cleistogamous flowers often present..................3. C. benghalensis
2. spathe complicate, cleistogamous flowers absent
3. Stem with reddish brown streaks, seeds tuberculate and reticulate
..........................................................4. C. diffusa
3. Stem without reddish brown streaks, seeds smooth
4. Capsule 2- or 1-celled........................................2. C. attenuata
4. Capsule 3-celled
5. Leaves narrowly lanceolate or obtlong-lanceolate, sheath 7-12 mm long...............................6. C. hasskarlii
5. Leaves linear-lanceolate, sheath 15-25 mm long
..........................................................7. C. longifolia
1. All ovary cells 1-ovuled
6. Ovary 2-celled
7. Spathe complicate, 3.5-6 cm long..............................1. C. appendiculata
7. Spathe cucullate, 1-2 cm long....................................9. C. suffruticosa
6. Ovary 3-celled
8. Stem glabrous, capsule 3-valved...................................8. C. paludosa
8. Stem hairy, capsule 2-valved......................................5. C. erecta

1. Commelina appendiculata C.B. Clarke, Commelina.
Cytandr. bengal.
Fl. & Fr. : May – June
Distrib. : Bangladesh, Sri Lanka; Orissa, Sikkim, West Bengal; Purnia.
Status : Infrequent

Fl. & Fr. : September - November
Distrib. : Sri Lanka; Madhya Pradesh, Maharashatra, Orissa, Kerela; Ranchi, Hazaribagh, Parasnath, Rajmahal hills, Manbhum, Chotanagpur, Lohardagga, Palamau.
Status : Common in damp or moist places
Specimens Examined : Lohardagga, 11.10.1873, C.B. Clarke 20903 (CAL); Manbhum, J. Campbell, G. Watt. 8175 (CAL).

Loc. name : Dhola, Kanchara, Kanchira, Kena
Fl. & Fr. : August – December
Distrib. : Africa, China, Japan, Malaysia; throughout India; Palamau, Motihari, Hazaribagh, Rajmahal hills near Sahibganj, Gaya, Ranchi, Chotanagpur, Santal Pargana, West Champaran, Munghyr, Saharsa.
Status : Common along the margins of waterbodies or in waterlogged rice-fields or in marshy land.
Uses : Plants are used in the treatment of leprosy, rheumatism, dyspepsia; leafy twig used as a cattle feed.
Specimens Examined : Rajmahal hills, 10/1870, Kurz Acc. No. 487339 (CAL); Hazaribagh, Chotanagpur, 05.10.1893, C.B. Clarke 20688 (CAL); Gaya, 10.10.1902, J.D. Nusker 12 (CAL).

4. Commelina diffusa Burm., Fl. Ind. 18, t.7, f. 2.1768.
Fl. & Fr. : July – November
Distrib.: Pantropical; throughout India; Singhbhum, Palamau (Netarhat), Ranchi.

Status: Common in wet places and marshes.

Use: Plants are used as a remedy against burns, itches and boils.


5. **Commelina erecta** L., Sp. Pl. 41.1753.


Loc. name: Jata kanchira

Fl. & Fr.: June – December

Distrib.: Africa, Australia, Malaysia, Sri Lanka; Andhra Pradesh, Karnataka, Kerala, Tamil Nadu; Rajmahal hills, Palamau (Netarhat), Parasnath.

Status: Common in damp or moist places.


6. **Commelina caroliniana** Walter, Fl. Carol. 68.1788.


Fl. & Fr.: September – March

Distrib.: Throughout India; Ranchi, Singhbhum, Hazaribagh, West Champaran, Palamau, Lohardagga, Chotanagpur, Purnia.

Status: Common in moist or damp places.

Specimens Examined: Chotanagpur, 22.11.1875, J.J. Wood Acc. No. 487320 (CAL); Hazaribagh, 03.10.1883, C.B. Clarke 33799 (CAL); Udaipur, Champaran, 10.11.1963, B.V. Shetty 205 (CAL).

7. **Commelina longifolia** Lam., Encycl. 1:129.1783.


Loc. name: Birkana arak, Panikanchira

Fl. & Fr.: April – November

Distrib.: Bangladesh, Hong Kong, Myanmar, Java; Assam, Rajasthan, Uttar Pradesh, West Bengal; Parasnath, Chotanagpur, Purnia, West Champaran, Palamau (Netarhat), Ranchi, Dharbhanga, Munghyr, Hazaribagh.

Status: Common in moist or damp places.

Uses: Herbs are used as a medicine in the treatment of dysentery and also as cattle feed.


Loc. name: Jata kanchira

Fl. & Fr.: September – December

Distrib.: Java, Malay Islands, Sri Lanka; throughout India; Ranchi, Monghyr, Hazaribagh, Parasnath, Palamau.

Status: Common in damp or moist places.

Specimen Examined: Karampada, 07.01.1961, G.V.S. Rao 23230 (CAL).


Loc. name: Dareorsa

Fl. & Fr.: August – December

Distrib.: Malay Peninsula, Nepal; Madhya Pradesh, Orissa, Sikkim, West Bengal; Munghyr, Singhbhum, Ranchi, West Champaran, Bettiah, Palamau, Chotonagpur, Gaya.

Status: Common

Specimens Examined: Ranchi, 22.10.1873, C.B. Clarke 20379 (CAL); Chotanagpur, 12.09.1896, D. Prain Acc. No. 487668 (CAL); Gobardhana Forest, Champaran, 15.11.1963, B.V. Shetty 328 (CAL).


KEY TO THE SPECIES

1. Stem pubescent

2. Leaves linear-ovate, 3-7 cm long..........................2. **C. fasciculata**

3. Leaves oblong, 10-25 cm long..............................3. **C. tuberosa**

1. Stem glabrous

3. Leaves 1-2 cm wide, petals bluish-violet...............1. **C. cristata**

3. Leaves 5-7 mm wide, petals blue.........................4. **C. vaga**

1. **Cyanotis cristata** (L.) D. Don, Prodr. Fl. Nepal. 46.1825; Hook.f., Fl.


**Commelina cristata** L., Sp. Pl. 42.1753.

Fl. & Fr.: April – November

Distrib.: Bangladesh, Hong Kong, Myanmar, Java; Assam, Rajasthan, Uttar Pradesh, West Bengal; Parasnath, Chotanagpur, Purnia, West Champaran, Palamau (Netarhat), Ranchi, Dharbhanga, Munghyr, Hazaribagh.

Status: Common in moist or damp places.

Uses: Herbs are used as a medicine in the treatment of dysentery and also as cattle feed.

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Manbhum, West Champaran, Palamau (Betla), Ranchi, Saharsa, Hazaribagh.

Status : Common in moist places.

Specimens Examined : Rajmahal hills, South of Sahibgunj, 03.11.1868, S. Kurz Acc. No. 488648 (CAL); Parasnath, Chotanagpur, 30.09.1873, C.B. Clarke 21328 (CAL); Gaya, Oct. 1902, J.D. Nusker Acc. No. 488652 (CAL); Champaran, 14.11.1963, B.V. Shetty 273 (CAL).


Fl. & Fr. : July – September

Distrib. : Sri Lanka; Karnataka, Kerala, Orissa, Tamil Nadu; Hazaribagh.

Status : Common in moist places.


Loc. name : Merom chunchi

Fl. & Fr. : August – November

Distrib. : Sri Lanka; Orissa, South India; Chotonagpur, Singhbhum, Ranchi.

Status : Infrequent


KEY TO THE VARIETIES

1. Stem villous, leaf-sheath up to 2.5 cm long ..1. C. tuberosa var. tuberosa

1. Stem scarcely pubescent, leaf-sheath up to 2 cm long……………………….. 2. C. tuberosa var. adscendens

1. Cyanotis tuberosa (Roxb.) Schult. & J.H. Schult. var. tuberosa

2. Cyanotis tuberosa var. adscendens (Dalzell) C.B. Clarke in A. DC.,


Cyanotis adscendens Dalzell in Hook., J. Bot. 343.1852.

Fl. & Fr. : August – October

Distrib. : Chgotanagpur, Ranchi, Singhbhum.

Status : Endemic

Uses : The roots are edible and often given in long-continued fever, as anthelmintic for cattle; leaves are eaten as a pot-herb.


Veg. 7:1153.1830.


Fl. & Fr. : August – October

Distrib. : China, Myanmar, Java; Kashmir, Meghalaya, Orissa, West Bengal; Palamau.

Status : Infrequent


KEY TO THE SPECIES

1. Ovary one ovulate in each cell………………………………..7. M. vaginata

1. Ovary two-many ovulate in each cell

2. Cells of the ovary 2-ovuled……………………………..5. M. nudiflora

2. Cells of the ovary 3-many ovuled


3. Panicles leafy

4. Leaves linear-lanceolate, flowers white or pinkish-white

5. Petals elliptic, 4-5 mm long………….1. M. blumei

5. Petals obovate, 7-10 mm long……......2. M. divergens

4. Leaves obleng or oblong-lanceolate, flowers blue
6. Herb, stout, leaves 15-30 cm long……4. *M. japonica*
6. Herb, procumbent or ascending, leaves 1-4 cm long
…………………………………….6. *M. spirata*

*Dicchoespernum blumei* Hassk., Commelin. Ind. 41.1870.

*Aneilema herbaceum* var. *divergens* C.B. Clarke in J. Linn. Soc. 6:448.1871.

*Commelina scapiflora* Roxb., Fl. Ind. 1:178.1820.

*Commelina japonica* Thunb. in Trans. Linn. Soc. 2:332.1794.


*Commelina spirata* L., Mant. Pl. 2: 176. 1771.

Specimens Examined: Parasnath, S. Kurz Acc. No. 487885 (CAL); Parasnath, Chotanagpur, 09.04.1871, C.B. Clarke 13994 (CAL).

Distrib. : Bangladesh, Malaysia, Myanmar, Nepal; Assam, Madhya Pradesh, Meghalaya; Chotanagpur, Palamau, Ranchi.

Status : Rare in marshy areas and other wet places.
Specimen Examined : Koderma, RPB 342.

*Aneilema divergens* var. *divergens* C.B. Clarke in J. Linn. Soc. 6:448.1871.

Fl. & Fr. : July – October
Distrib. : Bangladesh, Malaysia, Myanmar, Nepal; Assam, Madhya Pradesh, Meghalaya; Chotanagpur, Palamau, Ranchi.

Status : Rare in marshy areas and other wet places.
Specimen Examined : Koderma, RPB 342.

*Commelina japonica* Thunb. in Trans. Linn. Soc. 2:332.1794.

Fl. & Fr. : August – October
Distrib. : Bhutan, Malay Islands, Myanmar; Madhya Pradesh, Orissa, Sikkim, West Bengal; Chotanagpur, Ranchi, Hazardibagh, Parasnath, Palamau.

Status : Common
Specimens Examined : Chotanagpur, J.J. Wood Acc. No. 487972 (CAL); Parasnath, 22.09.1858, C.B. Clarke Acc. No. 487970 (CAL).

Loc. name : Kureli
Fl. & Fr. : June – November
Distrib. : Africa, China, Japan, Malaysia, Sri Lanka; throughout India; Purnia, Santal Pargana, Singhbhum, Ranchi, Manbhum, Chotanagpur, West Champaran, Palamau, Bhagalpur, Munghyr, Hazaribagh.

Status : Common in wet places, marshes, paddy fields.
Use : Plant used in the treatment of asthma, leprosy and piles.


Loc. name : Kanduli
Fl. & Fr. : June – November
Distrib. : Africa, China, Japan, Malaysia, Sri Lanka; throughout India; Purnia, Santal Pargana, Singhbhum, Ranchi, Manbhum, Chotanagpur, West Champaran, Palamau, Bhagalpur, Munghyr, Hazaribagh.

Status : Common in wet places, marshes, paddy fields.
Use : Plant used in the treatment of asthma, leprosy and piles.

*Commelina spirata* L., Mant. Pl. 2: 176. 1771.

Fl. & Fr. : September – December
Distrib. : Africa, China, Japan, Myanmar; throughout India; Gaya, Purnia, Chotanagpur, West Champaran, Palamau, Manbhum, Ranchi, Parasnath, Hazardibagh.
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Status : Common in wet places and rice-fields.


- Commelina vaginata L., Mant. Pl. 2:177.1771.

Fl. & Fr. : August – October
Distrib. : Bangladesh, China, Sri Lanka; throughout tropical India; Purnia, Chotanagpur, Lohardagga, Palamau, Hazaribagh, Manbhum, Ranchi, Bhagalpur.

Status : Common in rice-fields and moist places.
Specimens Examined : Hazaribagh, 13.10.1883, C.B. Clarke 33798 (CAL); Chutanagpur, 16.09.1886, A. Campbell, G. Watt 7693 (CAL).


- **Rhoeo spathacea** (Sw.) Stearn in Baileya 5:198.1957.
- **Tradescantia spathacea** Sw., Prodr. 57.1788.
- **Tradescantia discolor** L’ Her., Sert. Angl. 8:12.1788 or 1789.

Fl. : Throughout the year
Distrib. : America, Cuba, Mexico; throughout India; throughout the states.

Status : Commonly grown as a garden ornamental.


Key to the species
1. Flowers blue, filaments bearded, capsule 6-lobed……………1. **T. axillaris**
2. Flowers pinkish-purple, filaments glabrous, capsule 3-lobed...2. **T. cucullata**


**Commelina axillaris** L., Sp. Pl. 42.1753.


Loc. name : Baghanulla, Soltraj.
Fl. & Fr. : July – December

Distrib. : Australia, China, Malaya, Sri Lanka; throughout India; West Champaran, Chotanagpur, Manbhum, Munghyr, Palamau, Ranchi, Hazaribagh.

Status : Common in swamps, marshes and in the rice-fields.

Uses : Plants are used for curing of tympanities, ascites and abortions; seeds are consumed at the time of scarcity; leaves are used in ringworm and other skin diseases.


**Tradescantia cucullata** Roth, Nov. Pl.Sp.189.1821.


Fl. & Fr. : August – November
Distrib. : Peninsular India; Chotanagpur, Hazaribagh.

Status : Common in swampy areas, rice-fields and along the banks of ponds.

7. **Zebrina** Schnizl. in Bot. Zeit. 7:870.1849.


Fl. & Fr. : March
Distrib. : Mexico.

Status : Cultivated

**DISCUSSION**

A total number of 25 species and one variety belonging to 7 genera under the family Commelinaceae are encountered during the study in the states. The dominant genera on the basis of number of species (mentioned in the parentheses) are Commelina (9), Murdannia (7) and Cyanotis (4). Out of 26 taxa, 16 are common, one is rare and one is endemic. Few species under the family Commelinaceae presented here are ethnobotanically important. Two members are ornamental garden plants.

**Acknowledgements**

The author is grateful to the Director, Botanical Survey of India, Calcutta for giving institutional support and also thankful to the Head and other faculty members of different colleges and universities particularly in Bihar and Jharkhand states for their assistance during the study.

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