



Short communication

Endemic vascular plants of Odisha: A reappraisal

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ABSTRACT

With an estimated 3,000 wild plant species, Odisha is considered as a biodiversity rich state in India. While more than 100 species are listed as classified as threatened plants, only few are strictly endemic and their distribution restricted to the geographical boundary of Odisha State. Thorough scrutiny of published literature, study of herbarium specimens and based on primary field data collected by the authors, 17 vascular plant taxa belonging to 12 genera under 7 families are found to be endemic to Odisha. This includes 4 neo-endemic and 13 paleo-endemic species of plants. Poaceae and Orchidaceae are the families having maximum number of endemic species, 7 and 4 species respectively. Notes on taxonomy and nomenclature of certain endemic plants of Odisha has been provided along with a complete list of 17 endemic taxa of Odisha with notes on their habit, habitat, distribution and conservation status of each of them.

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Endemism in plants is a phenomenon or an ecological state in which species are found to occur in restricted areas, isolated by geographical or temporal barriers. Most of the endemic taxa are seen confined to small areas like islands, peninsulas, mountain ranges, plateaus or in distinct phytogeographical regions. Endemism in plant kingdom has become a subject of fascination for the taxonomists and presence of endemic taxa makes their area of occurrence biologically unique and interesting. Besides, endemic species throw some light on the biogeography, centres of speciation, areas of extinction, vicariance and adaptive evolution of the biological entities (Singh *et al.*, 2015). It is generally perceived that physical, climatic and biological factors contribute to endemism. The two sub-categories of endemism such as “paleoendemic” refers to species that were widespread earlier but are now restricted to a smaller area and “neoendemic” refers to species that have recently evolved through divergence and reproductive isolation or through hybridization and polyploidy. Endemic taxa can easily become threatened or extinct, if their habitats get modified rapidly and drastically. Species with narrow distribution range and/or fewer individuals are prone to extinction due to changing climatic conditions and competition by alien species. Endemic species have long been targets for conservation efforts because of imminent danger on their survival. Out of 45,000 plant species reported

from India so far, 4381 vascular plants belonging to 1007 genera and 176 families are recorded as strict endemics to the Indian political boundary (Singh *et al.*, 2015). Of these, 4303 taxa are angiosperms, 12 species are gymnosperms and 66 are pteridophytes. In the present paper, in addition to field observations of the authors, attempts have been made to examine published literature, herbarium specimens and bring out a list of strict endemic species of the state of Odisha.

Saxena and Brahmam (1994-1996) listed 28 plant taxa as endemic to the state of Odisha. Out of them, *Aglaia haslettiana*, *Mucuna minima*, *Cedrela brevipetiolulata*, *Oldenlandia arenaria*, *Premna calycina*, *Premna latifolia* var. *mucronata*, *Liparis vestita* ssp. *seidenfadenii* and *Gardenia gummifera* var. *gummiferoides* have been reduced to synonyms of *Aglaia lawii*, *Mucuna pruriens*, *Toona sureni* var. *celebica*, *Oldenlandia stricta*, *Premna barbata*, *Premna mollissima*, *Liparis vestita* and *Gardenia gummifera* respectively which are widespread and reported to occur in other Indian states and beyond India (Panda & Das, 1997; Singh *et al.*, 2015). Identity of *Tephrosia purpurea* var. *maritima*, earlier reported as an endemic infra-specific taxon, is doubtful as no herbarium specimens are available in any of the herbaria. Some species such as *Habenaria panigrahiana* var. *panigrahiana*, *Odisha cleistantha*, *Rhynchosia hainesiana* and *Lasiococca comberi*, previously described as endemic to Odisha, have subsequently been

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reported to occur in other Indian states. *Combretum albidum* G. Don var. *cooperi* (Haines) Saxena & Brahmam was a new combination based on *C. ovalifolium* Roxb. var. *cooperi* Haines. This variety was described by H. H. Haines on the basis of Cooper's collection from Kalahandi, Odisha and the taxon has not been recollected till date. Similarly, *Diospyros ebenum* var. *acuminata* Haines described on the basis of his own collections of H. H. Haines from Champagarh forest, Puri (Haines 4094) and Angul (Haines 2510) and later collected by Mooney (Mooney 2874) before 1950 from Khandapada, Nayagarh need to be re-located and its population assessed.

Oryza jeyporensis Govindsw. & Krishnam., a wild rice described from Jeypore tract, has been reduced to a synonym of widespread *Oryza rufipogon* Griff. Similarly, *Heritiera kanikensis* is an unresolved name and no specimen is available in any herbaria to authenticate its identity. *Zeuxine lindleyana*, earlier considered to be endemic to Odisha, has recently been reported to occur in north India. Similar is the case with two previously described endemic species of *Strobilanthes* of Odisha. The herbarium specimen of *Strobilanthes circarensis* Gamble available at K was collected by J. S. Gamble (21779 Dt. January, 1890) from Peddavalasa, Visakhapatnam district of Andhra Pradesh and therefore, this species can no more be treated as a strict endemic species of Odisha. Later, it is reported from Visakhapatnam hills, Peddavalasa, Endrica and Vantala of Andhra Pradesh. Besides, it is kept as an "unresolved" species in the "The Plant List 2013" (version 1.1.) (<http://www.theplantlist.org>). Similarly, in case of *Strobilanthes jeyporensis* Bedd., the herbarium specimen available at K (Acc. No. K000882916) was collected by R. H. Beddome from Golkonda hills of Andhra Pradesh and therefore, cannot be considered as endemic to the state of Odisha. This is also an "unresolved" species as per "The Plant List 2013" (version 1.1.) (<http://www.theplantlist.org>).

While enumerating the endemic orchids of peninsular India, Jalal & Jayanthi (2012) reported the occurrence of 12 endemics from Odisha, of which 4 species are reported as strict endemic species to the state. However, two of them namely, *Odisha cleistantha* and *Habenaria panigrahiana* var. *panigrahiana* have been found to occur outside the geographical boundary of the state too. *Liparis espevijii* S. Misra has been reduced to a synonym of *Liparis vestita* Rchb. f., which is distributed from NE India to Thailand. Similarly, *Cirrhopetalum panigrahianum* (S. Misra) S. Misra is now considered as a synonym of *Bulbophyllum sarcophyllum* (King & Pantl.) J. J. Sm. – an orchid also known to occur in Myanmar and Nepal.

Misra (2012 and 2014) described a two new orchid species *Liparis udaii* Misra and *Zeuxine mooneyi* Misra from Rebana forest of Keonjhar, Odisha, which are also considered neo-endemic taxa. Only few individuals of these two species occur in the type locality and need to be conserved *in situ*.

Cycas circinalis var. *orixensis* Haines, earlier considered as endemic to Odisha has been reduced to a synonym of *Cycas sphaerica* Roxb., which also occurs in East Indian states of Andhra Pradesh and Tamil Nadu. Recently, Singh *et al.* (2015) described a new species *Cycas nayagarhensis* from Nayagarh of Odisha and raised *Cycas circinalis* var. *orixensis* to the rank of a species as *Cycas orixensis* (Haines) Singh & Khuraijam. With this, now there are 2 more additions to endemic cycads of Odisha, of which one is neo-endemic and require further field level inventory.

Chorghé *et al.* (2015 and 2016) described two new grass species namely *Tripogon mahendragiriensis* and *Themeda odishae* from Mahendragiri hills of Gajapati district, Odisha and are, therefore, to be considered as neo-endemics. Besides, they rediscovered five endemic grass species of Odisha such as *Dimeria mooneyi*, *Dimeria orissae*, *Dimeria mahendragiriensis*, *Themeda saxicola* and *Themeda mooneyi*, four of which were not collected after its first collection by H. F. Mooney before 1950.

List of 17 strict endemic species of Odisha along with notes on taxonomy and nomenclature, habit, habitat, distribution and conservation status has been provided in Table 1.

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Table 1
The list of endemic plant species of Odisha with notes on habit, distribution and conservation status

Sl. No.	Species	Family	Habit	Distribution	Conservation status	Remarks
1	<i>Aspidopterys tomentosa</i> A. Juss. var. <i>hutchinsonii</i> (Haines) R. C. Srivastava	Malpighiaceae	Climber	Collected by H. H. Haines in 1920 from Bhanjam hills, Mayurbhanj.	Not assessed	Type specimen (Haines 4181) is available at K and CAL; not recorded after its first collection by H. H. Haines.
2	<i>Cycas orixensis</i> (Haines) Singh & Khuraijam	Cycadeaceae	Tree	From Ganjam district in South to Mayurbhanj in North	Population studies in Odisha are being carried out.	Earlier known as <i>Cycas circinalis</i> var. <i>orixensis</i> Haines, recently elevated to the rank of species.
3	<i>Cycas nayagarhensis</i> Singh, Radha & Khuraijam	Cycadeaceae	Tree	Recently described as a new species from Nayagarh district.	Only 100 individuals are reported in two hills of Nayagarh district	Population inventory need to be made and identity need be confirmed.
4	<i>Dimeria mahendragiriensis</i> Ravi, Saxena & Brahmam	Poaceae	Herb	Collected from Mahendragiri hills, Gajapati district; not known to occur in any other locality of Odisha.	Population studies are yet to be conducted.	The species has been recently collected from its type locality by Chorghe <i>et al.</i> (2015).
5	<i>Dimeria mooneyi</i> Raizada	Poaceae	Herb	Sunabeda plateau	Population studies not done	The type specimen available at K (Mooney, 3652) was collected by H. F. Mooney from Sonabera village, Sambalpur district (?) in September-October, 1949. Chorghe <i>et al.</i> (2015) collected the species from Sunabera plateau recently.
6	<i>Dimeria orissae</i> Bor	Poaceae	Herb	Sunabeda plateau	Population inventory needs to be undertaken.	The type specimen (previously identified as <i>Dimeria connivens</i> Hack. by H. F. Mooney) as available at K (Mooney, 2758) was collected by H. F. Mooney

Sl. No.	Species	Family	Habit	Distribution	Conservation status	Remarks
7	<i>Eria meghasaniensis</i> (S. Misra) S. Misra	Orchidaceae	Epiphytic herb	Only known to occur on mountain peaks of Meghasani and Khairiburu hills of Similipal	Only 200-300 plants are found in natural habitats.	Recent collections have been made from the type locality and attempts are underway to propagate the species.
8	<i>Eriolaena hookeriana</i> Wt. & Arn. var. <i>viridis</i> Haines	Sterculiaceae	Tree	Karlapat Wildlife Sanctuary	Population studies are yet to be conducted by RPRC	Recent collections have been made from Karlapat.
9	<i>Flacourtia indica</i> (Burm. f.) Merr. var. <i>innocua</i> (Haines) Saxena & Brahmam	Flacourtiaceae	Shrub	Khandagiri hills, Khurda	Population size and phyto-sociology not known.	Recent collection has been made from Ranpur, Nayagarh District by Odisha Biodiversity Board
10	<i>Homonoia intermedia</i> Haines	Euphorbiaceae	Shrub	Collected and described from Mahanadi river bed at Tikarpada by H. Haines in 1917; not known to occur anywhere.	The species need to be searched for in its type locality.	Herbarium specimen (Haines, 2505) collected from Tikarpada on 13 March, 1917 and specimen (Haines, 2505a) collected from the same locality in April, 1917 are available at K.
11	<i>Habenaria panigrahiana</i> var. <i>parviloba</i> S. Misra	Orchidaceae	Herb	Reported from Bhanjanagar, Ganjam by S. Mishra	Size and structure of population not known.	No collection has been made in recent times. But <i>H. panigrahiana</i> var. <i>panigrahiana</i> has been reported from Odisha, Andhra Pradesh and Tamilnadu
12	<i>Liparis udaitii</i> S. Misra	Orchidaceae	Herb	Khajuridhi Forest Block in Sundargarh district	Population data not available.	Described as a new species by S. Mishra.

Sl. No.	Species	Family	Habit	Distribution	Conservation status	Remarks
13	<i>Themeda saxicola</i> Bor	Poaceae	Herb	Koraput district	Population studies has to be conducted	The type specimen (4241 Dt. 25.10.1950) collected by H. F. Mooney from Laxmipur, Koraput is available at K. Recently the species has been collected from its type locality (Chorghe <i>et al.</i> , 2015).
14	<i>Themeda odishae</i> Chorghe, Prasanna & Rao	Poaceae	Herb	Mahendragiri hill, Gajapati	More population level information is required.	Reported as a new species by Chorghe <i>et al.</i> (2016) from Mahendragiri hills.
15	<i>Themeda mooneyi</i> Bor	Poaceae	Herb	Koraput district	Population status has to be determined.	Type of the species collected by H. F. Mooney (4064 Dt. 10.10.1950) from Pottangi, Koraput and his other collection (4064 Dt. 10.10.1950) from Turia Konda, Deomali, Koraput are available at K. Chorghe <i>et al.</i> (2015) collected the species from its type locality after 65 years.
16	<i>Tripogon mahendragiriensis</i> Chorghe, Dey, Prasanna & Rao	Poaceae	Herb	Mahendragiri hills, Gajapati	Population studies are yet to be conducted.	A recently described species from Mahendragiri (Chorghe <i>et al.</i> , 2015).
17	<i>Zeuxine mooneyi</i> S. Misra	Orchidaceae	Herb	Rebana forest, Keonjhar	Size and structure of population have to be studied.	A neo-endemic species recently described by S Misra (2014).