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Revision trial in recent enumeration of *Nepenthes* species

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Abstract. On the basis of the recent, successive publications of *Nepenthes* monographs, the genus is estimated to consist of 91 distinct species listed in Table 1.

Introduction

Taxonomic treatment of species in *Nepenthes*, the Nepenthaceae rather not use stable sex organs but use vegetative organs such as leaf and pitcher with respect to morphology and structure supposedly unstable and variable caused by environmental changes in habitat. Flower characters of *Nepenthes* species are similar to each other. Standardization of taxonomic treatment is depended on which taxonomic characters are pointed out by authors or author's subjectivity. Thus, some distinct species are sometime treated as synonyms while some are in opposite opinions and some synonymous species and sometime changed ranking to independent species according to the presnt enumeration. Production of perfect list of taxonomically distinct species does not mean the summary result or thought of the *Nepenthes* taxonomists. Concerning these circumstances, the *Nepenthes* species described already by certain monographers after Macfarlane (1908) are here ventured to be revised and enumerated to see the whole view of the taxonomy of the genus since they have been taxonomically well revised and monographed and several new species of the genus have been described well these one decade.

Materials and Methods

In convenience, newly added and described species and eliminated species put into varietal or lower or synonym rankings in *Nepenthes* after Macfarlane's monograph (1908) were reviewed in literature information to meet the present trend of the species. The 57 distinct species Macfarlane (1908) described were put at the first step of study, while the synonymously treated species were put out of study excepting *N. fallax*, *N. hispida* and *N. sumatrana* later placed in the distinct species by some different workers were placed in the first step of study. Those species accepted as the distinct species by various workers after Macfarlane (1908) are designated by the symbol (O) and those species justified synonymy under certain distinct species are designated by the symbol (S) in the list table.

The literatures and summaries in contents used in this study are listed as follows:

1. Macfarlane, J. M. (1908). Nepenthaceae, *In*: A.Engler, Das Pflanzenreich, Ⅳ. 111: 1-92.
   Addition to the already-known 51 species in *Nepenthes*, seven new species were reported; total 58 species and two natural hybrids were

described. He stated that *N. gracillima* is very close relative of *N. albomarginata*. If they are conspecific, the number of distinct species could be 57. *Nepenthes fallax* is treated as a synonym of *N. maxima*, *N. hispida* is treated as a synonym of *N. hirsuta*, and *N. sumatrana* is treated as a synonym of *N. treubian*.

2. Danser, B. H., 1928. The Nepenthaceae of the Netherlands Indies. Bull. Jard. Bot. Buitenzorg. Ⅲ.9: 249-438.
He revised *Nepenthes* species distributed in the former Dutch Indies (present Indonesia), Malaysia and the Philippines and 58 species of the genus together with synomyms treated by Macfarlane (1908) into 39 species. He accepted and added later four new species described by Macfarlane, two new species described by Ridley, three new species described by Lecomte, and 17 new species he described, total 65 species including two natural hybrids that were divided into six groups. He treated *N. edwardsiana* as a synonym of *N. villosa* and *N. ramispina* as a synonym of *N. gracillima*.
(Note: Plants in New Guinea identified as *N. vieillardii* by him were later described as *N. lamii* by Jebb and Cheek)

3. Kurata, S., 1976. *Nepenthes* of Mount Kinabalu. Sabah National Parks Trust. Kota Kinabalu, Sabah.
He revised the species of *Nepenthes* of Mt. Kinabalu, Borneo and accepted 16 species (one undescribed species was later described as *N. macrovulgaris*). He made *N. edwardsiana* revived. Additionally, he reported the list of 71 species and one hybrid of *Nepenthes* of the world.

4. Tamin, R. and Hotta, M., 1986. *Nepenthes* di Sumatra: The genus *Nepenthes* of the Sumatra Island. *In*: M. Hotta, Ed., Diversity and dynamics of plant life in Sumatra. Kyoto Univ.
They revised the species of *Nepenthes* in Sumatra and described 17 species and one natural hybrid. They treated *Nepenthes carunculata*, *N. pectinata* and *N. spathulata* as synonyms of *N. singalana* and *N. inermis* and *N. dubia* as synonyms of *N. bongso*. He made *N. sumatrana* revived. They added new species of *N. adnata*, *N. rosulata* and *N. spinosa* (all *nomina nuda*).

5. Phillipps, A. and Lamb, A., 1996. Pitcher Plants of Borneo. Natural Hist. Publ. Kota Kinabalu, Sabah.
They revised the species of the genus in Borneo and accepted 32 distinct species, seven natural hybrids and one undescribed species.

6. Jebb, M. and Cheek, M., 1997. A skeletal revision of *Nepenthes* (Nepenthaceae). Blumea, 42: 1-106.
They listed total 85 species including three hybrids and pended *N. deaniana*, *N. neglacta* and *N. smilesii* as little known taxa. They excluded *N. cincta*, *N. cristata* and *N. lindleyana*. They treated *N. longifolia* as a synonym of *N. sumatrana*, *N. talangensis* as a synonym of *N. bongso* and *N. tenuis* as a synonym of *N. dubia*. They made *N. eustachya*, *N. pectinata* and *N. ramispina* revived.
They treated *N. faizaliana and N. sandakanensis* as synonyms of *N. stenophylla*, *N. xiphioides* as a synonym of *N. pectinata* and *N. carunculata* as a synonym of *N. bongso*. Furthermore, they added and described six new species such as *N. argentii*, *N. aristolochioides*, *N. danseri*, *N. diatas*, *N. lamii* and *N. murudensis*.

7. Schlauer, J., 2000. World Carnivorous Plant List. 'CP database (15 Nov. 2000 ed.).
He accepted 88 species in the genus. He made *N. fallax* revived and

treated *N. pectinata* as a synonym of *N. gymnamphora* or *N. singalana* and furthermore, *N. stenophylladescribed by Danswer as a synonym of N. fallax.*

8. Clarke, C., 1997. *Nepenthes* of Borneo. Natural Hist. Publ. Kota Kinabalu, Sabah.
   He revised the species of the genus in Borneo. He made *N. faizaliana* revived and accepted total 31 distinct species. He treated *N. borneensis as a synonym of N. boschiana.*
9. Clarke, C., 2001. *Nepenthes* of Sumatra and Peninsular Malaysia. Natural Hist. Publ. Kota Kinabalu, Sabah.
   He revised the species of the genus in Sumatra and Malay Peninsula and reported total 34 distinct species in which *N. angasanensis*was not well studied. He made *N. longifolia, N. talangensis and N. tenuis* revived and put *N. pectinata* as a synonym of *N. gymnanphora.* He described *N. jacquelineae* as a new species and recorded *N. sp* A and additionally, *N. sp* B as undescribed taxa. He treated *N. beccariana* as little known taxon.
10. Cheek, M. and Jebb, M., 2001. Nepenthaceae. *In*: Flora Malesiana, I. 15. National Herb. Nederland.
    They revised the species of *Nepenthes* in Malesiana including Malaysia, Indonesia, Brunei and Philippines and accepted 82 species including three natural hybrids. They made *N. pectinata* revived and treated *N. borneensis* as a synonym of *N. boschiana.* They treated *Nepenthes deaniana* as little known taxon and eliminated *N. cincta, N. cristata, N. lindleyana and N. neglecta.* They treated *N. angasanensis* as a synonym of *N. mikei* and *N. wilkiei* as a synonym of *N. philippinensis.* They added *N. benstonei, N. faizaliana, N. lavicola and N. mira* as another distinct species.
11. Kurata, S., 2001. Two new species of *Nepenthes* from Sumatra (Indonesia) and Mindanao (Philippines). Journ. Insectiv. Plt. Soc. 52: 30-40. (*in Japanese*)
    He described two new species *N. mindanaoensis* from the Philippines and *N. pyriformis* from Sumatra. However, he rather removed the latter species from the present list of distinct species since Clarke (2001) commented and pointed out that the latter species might be a natural hybrid.

Conclusion

It could be reasonable that *Nepenthes* consists of 91 distinct species listed in Italic in the summary table. However, this tabulation of the distinct species of *Nepenthes* is only an integrated, speculated conclusion based on the standard references. Many more studies based on total field observation, herbarium works and experimental researches are expected to clarify and justify the final number of species of *Nepenthes.*

References

(The above references discussed are not included in this list)

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	Macfarlane (1908)	Danser (1928)	Kurata (1976)	Tamin & Hotta (1986)	Phillipps &Lamb (1996)	Jebb & Cheek (1997)	Schlauer (2000)	Clarke (1997) + (2001)	Cheek & Jebb (2001)	Kurata (2001)
N. adnata				O		O	O	O	O	
N. alata	O	O	O	O		O	O	O	O	
(N. alicae)	O	s				s	s	s	s	
(N. albolineata)	O	s				s	s	s	s	
N. albomarginata	O	O	O	O	O	O	O	O	O	
N. ampullaria	O	O	O	O	O	O	O	O	O	
N. anamensis	O	O	O			O	O			
(N. angasanensis)							s	O	s	
(N. angustifolia)	O	s				s	s	s	s	
N. argentii						O	O		O	
N. aristolochioides						O	O	O	O	
(N. armbrustae)	O	s				s	s		s	
(N. beccariana)	O	s				s	s	s	s	
N. bellii			O			O	O		O	
N. benstonei							O	O	O	
(N. bernaysii)	O	s				s	s	s	s	
N. bicalcarata	O	O	O		O	O	O	O	O	
(N. blancoi)	O	s				s	s		s	
N. bongso	O	O	O	O		O	O	O	O	
(N. borneensis)					O	O	s	s	s	
N. boschiana	O	O	O		O	O	O	O	O	
N. burbidgeae	O	O	O		O	O	O	O	O	
N. burkei	O	O	O			O	O		O	
N. campanulata			O		O	O	O	O	O	
(N. carunculata)		O	O	s		s	s	s	s	
(N. cholmondeleyi)	O	s				s	s	s	s	
N. clipeata		O	O		O	O	O	O	O	
(N. copelandii)	O	s				s	s		s	
N. danseri						O	O		O	
(N. deaniana)	O	O	O			*	O		*	
(N. decurrens)		O	O			s	s	s	s	
N. densiflora			O			O	O	O	O	
(N. dentata)			O		s	s			s	
N. diatas						O	O	O	O	
N. distillatoria	O	O	O			O	O			
N. dubia		O	O	s		O	O	O	O	
(N. echinostoma)	O	s				s	s	s	s	
N. edwardsiana	O	s	O		O	O	O	O	O	
N. ephippiata		O	O		O	O	O	O	O	
N. eustachya	O	s		s		O	O	O	O	
N. eymae						O	O		O	
N. faizaliana						s	O	O	O	
(N. fallax)	s	s				s	O	s	s	
N. fusca		O	O		O	O	O	O	O	
(N. garrawayae)	O	s				s	s	s	s	
(N. geoffrayi)		O	O			s	s		s	
(N. globamphora)			O			s	s		s	
N. glabrata						O	O		O	
N. gracilis	O	O	O	O	O	O	O	O	O	
N. gracillima	O	O	O			O	O	O	O	
N. gymnamphora		O	O			O	O	O	O	
N. hamata						O	O		O	
(N. hemsleyana)	O	s				s	s	s	s	
N. hirsuta	O	O	O		O	O	O	O	O	
N. hispida		s				O	s	O	O	
N. inermis		O	O	s		O	O	O	O	
N. insignis		O	O			O	O		O	
N. jacquelineae								O		
(N. jardinei)	O	s				s	s	s	s	
(N. kampotiana)		O	O			s	s		s	
(N. kennedyana)	O	s	O			s	s	s	s	
N. khasiana	O	O	O			O	O			
N. klossii		O	O			O	O		O	
N. lamii						O	O		O	
N. lavicola							O	O	O	
(N. leptochila)		O	O		O	s	s	s	s	

	Macfarlane (1908)	Danser (1928)	Kurata (1976)	Tamin & Hotta (1986)	Phillipps &Lamb (1996)	Jebb & Cheek (1997)	Schlauer (2000)	Clarke (1997) + (2001)	Cheek & Jebb (2001)	Kurata (2001)
N. longifolia						s	O	O	s	
N. lowii	O	O	O		O	O	O	O	O	
N. macfarlanei	O	O	O			O	O	O	O	
N. macrophylla					O	O	O	O	O	
N. macrovulgaris					O	O	O	O	O	
N. madagascariensis	O	O	O			O	O			
N. mapuluensis					O	O	O	O	O	
N. masoalensis						O	O			
N. maxima	O	O	O		O	O	O	O	O	
(N. melamphora)	O	s				s	s	s	s	
N. merrilliana		O	O			O	O		O	
N. mikei						O	O	O	O	
N. mindanaoensis										O
N. mira							O		O	
N. mirabilis		O	O	O	O	O	O	O	O	
N. mollis		O	O		O	O	O	O	O	
(N. moorei)	O	s				s	s	s	s	
N. muluensis			O		O	O	O	O	O	
N. murudensis					O	O	?	O	O	
(N. neglecta)	O	O	O			*	s	s	*	
N. neoguineensis		O	O			O	O		O	
N. northiana	O	O	O		O	O	O	O	O	
(N. oblanceolata)		O				s	s		s	
N. ovata						O	O	O	O	
N. paniculata		O	O			O	O		O	
N. papuana		O	O			O	O		O	
(N. pectinata)		O	O	s		O	s	s	O	
N. pervillei	O	O	O			O	O			
N. petiolata		O	O			O	O		O	
N. philippinensis	O	O				s	O		O	
N. pilosa		O	O		O	O	O	O	O	
(N. phyllamphora)	O	s		s		s	s	s	s	
N. rafflesiana	O	O	O	O	O	O	O	O	O	
N. rajah	O	O	O		O	O	O	O	O	
N. ramispina		s				O	s	O	O	
N. reinwardtiana	O	O	O	O	O	O	O	O	O	
N. rhombicaulis			O	O		O	O	O	O	
(N. rosulata)				O		s	s	s	s	
(N. rowanae)	O	s				s	s	s	s	
(N. sandakanensis)						s	s		s	
N. sanguinea	O	O	O			O	O	O	O	
N. sibuyanensis							O		O	
N. singalana	O	O	O	O	O	O	O	O	O	
(N. smilesii)	O	s				*	s		*	
N. spathulata			O	s		O	O	O	O	
N. spectabilis		O	O	O		O	O	O	O	
(N. spinosa)				O		s	s	s	s	
N. stenophylla	O	O	O		O	O	O	O	O	
N. sumatrana		s		O		O	O	O	O	
N. talangensis						s	O	O	s	
N. tentaculata	O	O	O		O	O	O	O	O	
N. tenuis						s	O	O	s	
N. thorelii		O	O			O	O			
N. tobaica		O	O	O		O	O	O	O	
N. tomoriana		O	O			O	O		O	
N. treubiana	O	O	O			O	O	O	O	
N. truncata		O	O			O	O		O	
(N. tubulosa)	O	s				s	s	s	s	
N. veitchii	O	O	O		O	O	O	O	O	
N. ventricosa	O	O	O			O	O		O	
N. vieillardii	O	O	O			O	O			
N. villosa	O	O	O		O	O	O	O	O	
(N. wilkiei)							s		s	
(N. xiphioides)						s	s	s	s	
TOTAL	(57)	(63)	(70)	(16)	(32)	(82)	(88)	(62)	(79)	(1)
独立種（イタリック）＝91				(スマトラ)	(ボルネオ)			(ボルネオ・スマトラ・マレー半島)	(マレシア)	(追加)

O：独立種　s：シノニム　＊：削除または保留