



Tupistra khangii (Asparagaceae), a new species from northern Vietnam

NIKOLAY A. VISLOBOKOV^{1,2,*}, NORIYUKI TANAKA³, LEONID V. AVERYANOV⁴, HIEP TIEN NGUYEN⁵, MAXIM S. NURALIEV^{1,2} & ANDREY N. KUZNETSOV^{2,6}

¹Faculty of Biology, M.V. Lomonosov Moscow State University, 1-12, Leninskie Gory, 119234, Moscow, Russia; e-mail: n.vislobokov@gmail.com

²Joint Russian-Vietnamese Tropical Scientific and Technological Center, Cau Giay District, Ha Noi, Vietnam

³98-11, Otsuka, Hachioji, Tokyo 192-0352, Japan

⁴Komarov Botanical Institute, Russian Academy of Science, 2, Prof. Popov Str., 197376, St. Petersburg, Russia

⁵Center for Plant Conservation, 25/32, lane 191, Lac Long Quan, Nghia Do, Cau Giay District, Ha Noi, Vietnam

⁶A.N. Severtsov Institute of Ecology and Evolution of Russian Academy of Sciences, 33, Leninsky Pr., Moscow, Russia

*author for correspondence

Abstract

Tupistra khangii (Asparagaceae) is described and illustrated as a new species from mountain areas in northern Vietnam. It is distributed widely in north-western Vietnam and adjacent territories.

Key words: *Tupistra khangii*, Asparagaceae, plant taxonomy, plant diversity, Vietnam

Introduction

Tupistra Ker Gawler (1814: 1655) is a genus of the subfamily Nolinoideae (Chase *et al.* 2009) belonging to the family Asparagaceae (e.g. APG 2009). More than fifty species have hitherto been classified under *Tupistra* (IPNI 2014), but many of them were recently transferred to *Rohdea* Roth (1821: 196) by Tanaka (2003a, 2010a). *Tupistra*, as circumscribed by Tanaka (2003b, 2010b), is distinguishable from *Rohdea* redefined by Tanaka (2003a, 2010a) by the leaves with more slender petiolar base, relatively larger stigma broader than the style, stouter columnar style almost as thick as the ovary, and usually tuberculate, non-scarlet, spherical berry-like fruit. The species of *Tupistra* are herbaceous perennials, occurring in the tropical forests of SE Asia including Indochina, where they occasionally form dense local populations. Several studies on karyology (e.g. Yang 1995, Huang & Liu 1996, Hu *et al.* 2013), breeding system (Qiao *et al.* 2010), and suitability for food (Nuntayana 2013) have been carried out, but there still are many aspects not satisfactorily investigated, including their taxonomy and phytogeography. Two of us have already described a new species, *Tupistra theana* Averyanov & Tanaka (2012: 164), from central Vietnam. In the present paper we describe a further new species from northern Vietnam.

Material and Methods

Specimens of the new species were collected in the field in northern Vietnam during the years 2006–2013. Former collections of the species by others kept in herbaria were also used as additional materials and designated as paratypes. Some portions (like flowers) of the living plants were fixed and stored in 70% ethanol. Measurements of the floral parts for the description were made on both living and fixed materials. It is noteworthy that the live flowers and their fleshy parts become shrunken up to 20–30% in the drying process of making herbarium specimens. In describing quantitative characters, infrequent extreme values (i.e. rarely occurring minimal and maximal values) of a variation range were parenthesized respectively before and after a normal variation range.

Id., mountain forest, elev. 700 m, 21°04,096'N, E 105°21,501'E. 20 October 2013, *N.A. Vislobokov 13049* (flowers in liquid collection at Moscow University, photo); Id., mountain forest, elev. 1093 m, 21°03.617'N, 105°21.809'E. 24–29 October 2013, *N.A. Vislobokov 13071/13063* (flowers and fruits in liquid collection at Moscow University); Nghe An prov., Ky Son distr., Na Ngoi municipality, eastern slopes of Phu Xai Lai Leng Mountain. Broad-leaved forest on steep mountain slopes, elev. 1300–1500 m a.s.l., around point 19°13'53.4"N, 104°12'09.7"E. 26 October 2013, *L. Averyanov, N.T. Hiep, N.S. Khang, L.M. Tuan, N.A. Trang, L.H. Dan, CPC 6344* (CPC!, LE!).

Etymology:—The new species is named after a Vietnamese botanist N.S. Khang, who collected best samples representing the species.

Ecology:—Primary and secondary broad-leaved evergreen lowland and submontane forests on sandstone, shale and granite, rarely on alluvium derived from limestone, common along damp rocky valleys or in shady humid depressions on mountain slopes, terrestrial on soils rich in humus or on large, shady, mossy, often wet boulders along mountain streams at elev. (300)500–1300(1500) m a.s.l. In optimal ecological conditions, large clump of many densely clustering stems, measuring 1.5–2.5 m across, develops from a single shortly branched rhizome. Locally often common.

Flowering:—September–December.

Fruiting:—October–February.

Pollination:—According our sporadic observations, flowers of *Tupistra khangii* visited by ants (Fig. 2k). Notable that ants were recognized as pollinators of *Rohdea* (Migliorato 1910). Also visits of ants recorded in flowers of closely related genus *Aspidistra* Ker Gawler (1822: 628) (Vislobokov *et al.* 2013). But its role in pollination of *Tupistra* is unclear.

Distribution:—Northern Vietnam. The new species is presently recorded from Ha Noi City area (Ba Vi distr.), and provinces Dien Bien (Dien Bien distr.), Hoa Binh (Luong Son distr.), Nghe An (Ky Son distr.) and Son La (Moc Chau and Van Ho distr.). It is probably a local endemic of north-eastern Indochina, ranging widely in north-western Vietnam and adjacent territories of north-eastern Laos.

Taxonomic relationships:—*Tupistra khangii* is very close to *T. longispica* Y.Wan & X.H.Lu in Wan (1984: 168) endemic to southwestern Guangxi but differs from it by the white stigma (vs. pale purple stigma), yellow pollen, and the shorter peduncle (vs. peduncle 20–33 cm long). The new species is also close to *T. hongheensis* G.W.Hu & H.Li in Hu *et al.* (2013: 230) occurring in southern Yunnan, but differs from it by the much shorter, erect or ascending rhizome (vs. long creeping rhizomes to 1 m long), the purplish flower buds (vs. greenish buds), the stamens arising from the base of perigone segments (vs. stamens from the middle of the segments), and the prickly tuberculate fruits (vs. subsmooth fruits). It is also close to *T. muricata* (Gagnepain 1934: 287) Tanaka (2003b: 335) [= *T. albiflora* Larsen (1961: 43)] occurring in northern Thailand, Laos and southern Yunnan (Tanaka 2010b), but differs by the much larger hemispheric or subcapitate stigma (vs. smaller, thin, centrally concave, peltate or subfunnel-shaped stigma). The pistil of *Tupistra khangii* is unique not only in its large subcapitate stigma which is prominently exerted from the perigone but also in the character that it becomes remarkably fissured toward the end of anthesis.

Acknowledgements

Field and laboratory studies were funded by U.S.A. National Geographic Society, grant *Exploration of primary woods along constructed highway Hanoi - Ho Chi Minh for their sustainable conservation (in limits of Ha Tinh and Nghe An provinces of central Vietnam)* #9129-12. Authors are grateful to T. Maisak for her help in preparation of ink drawings, to Olivier Colin and Jana Leong-Škorničková for photos and information about plants from Ba Vi, and to D.D. Sokoloff for discussion.

References

- APG III. (2009) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. *Botanical Journal of the Linnean Society* 161: 105–121.
<http://dx.doi.org/10.1111/j.1095-8339.2009.00996.x>
- Averyanov, L.V. & Tanaka, N. (2012) New species of *Peliosanthes* and *Tupistra* (Asparagaceae) from eastern Indochina. *Taiwania* 57: 153–167.
- Averyanov, L.V., Tanaka, N. & Nguyen, S.K. (2014) New species of *Peliosanthes* and *Rohdea* (Asparagaceae) from eastern Indochina. *Taiwania* 59: 18–25.

<http://dx.doi.org/10.6165/tai.2014.59.18>

- Chase, M.W, Reveal, J.L. & Fay, M.F. (2009) A subfamilial classification for the expanded asparagalean families Amaryllidaceae, Asparagaceae and Xanthorrhoeaceae. *Botanical Journal of the Linnean Society* 161: 132–136.
<http://dx.doi.org/10.1111/j.1095-8339.2009.00999.x>
- Gagnepain, F. (1934) *Gonioscypha muricata*. *Bulletin de la Société Botanique de France* 81: 287–288.
- Huang, J.-L. & Liu, X.-Z. (1996) A new species of the genus *Tupistra* (Convallariaceae), with reference to its karyotype and pollen morphology. *Acta Phytotaxonomica Sinica* 34: 592–596.
- Hu, G.-W., Li, H., Tan, Y., Liu, Y. & Long, C.-L. (2013) *Tupistra hongheensis* (Ruscaceae), a new species from Yunnan, China based on morphological, karyotypic, and pollen morphological studies. *Journal of Systematic and Evolution* 51: 230.
http://dx.doi.org/10.1111/jse.12008_6
- International Plant Names Index. (2014) Published on the Internet <http://www.ipni.org> [accessed 9 June 2014].
- Ker Gawler, J.B. (1814) *Tupistra squalida*. *Curtis's Botanical Magazine* 40: 1655.
- Ker Gawler, J.B. (1822) *Aspidistra lurida*. *The Botanical Register* 8: 628.
- Larsen, K. (1961) Studies in the flora of Thailand. Liliaceae, Triuridaceae, Trilliaceae, Iridaceae, Polygonaceae. *Dansk Botanisk Arkiv* 20: 37–54.
- Migliorato, E. (1910) Sullimpollinazione di *Rohdea japonica* Roth per mezzo delle formiche. *Annali di Botanica* 8: 241–242.
- Nuntayana, W. (2013) The study of *Tupistra albiflora* K.Larsen management as H.M. The king's sufficiency economy approach: a case of Thepsadej sub-district, Doisaked district, Chiang Mai province. *Area Based Development Research Journal* 5: 5–20.
- Qiao, Q., Zhang, C.-Q. & Milne, R.I. (2010) Population genetics and breeding system of *Tupistra pingbianensis* (Liliaceae), a naturally rare plant endemic to SW China. *Journal of Systematics and Evolution* 48: 47–57.
<http://dx.doi.org/10.1111/j.1759-6831.2009.00064.x>
- Remizowa, M.V., Rudall, P.J., Choob, V.V. & Sokoloff, D.D. (2013) Racemose inflorescences of monocots: structural and morphogenetic interaction at the flower/inflorescence level. *Annals of Botany* 112: 1553–1566.
<http://dx.doi.org/10.1093/aob/mcs246>
- Roth, A.W. (1821) *Novae Plantarum Species praesertim Indiae Orientalis*. H. Vogler, Halberstad, 411 pp.
- Tanaka, N. (2003a) New combinations in *Rohdea* (Convallariaceae). *Novon* 13: 329–333.
<http://dx.doi.org/10.2307/3393269>
- Tanaka, N. (2003b) Inclusion of *Tricalistra* and *Gonioscypha muricata* in *Tupistra* (Convallariaceae). *Novon* 13: 334–336.
<http://dx.doi.org/10.2307/3393270>
- Tanaka, N. (2010a) A taxonomic revision of the genus *Rohdea* (Asparagaceae). *Makinoa New Series* 9: 1–54.
- Tanaka, N. (2010b) A taxonomic revision of the genus *Tupistra* (Asparagaceae). *Makinoa New Series* 9: 55–93.
- Vislobokov, N.A., Kuznetsov, A.N. & Sokoloff, D.D. (2013) A new species of *Aspidistra* (Ruscaceae s.l., Asparagales) from southern Vietnam, field observations on its flowering and possible pollination by flies (Phoridae). *Plant Systematics and Evolution* 299: 347–355.
<http://dx.doi.org/10.1007/s00606-012-0725-2>
- Wan, H. (1984) New species of Liliaceae from Guangxi. *Bulletin of Botanical Research, Harbin* 4: 165–171.
- Yang, Q. (1995) Karyotypes of *Disporum sessile* and *Tupistra longispica* (Liliaceae). *Guihaia* 15: 158–162.