

New or Noteworthy Plant Collections from Myanmar (4): *Typhonium cordifolium* and two new species, *T. neogracile* and *T. praecox* (*Araceae*)

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Three species of *Typhonium* (*Araceae*) newly recorded from Myanmar in the course of the ongoing inventory work for the floristic analysis of Myanmar are reported with taxonomic comments. The first species, *Typhonium cordifolium*, has been known from Thailand only. The second species, previously called *T. gracile* and known from Khasi Hill in North India, was re-described as *T. neogracile* based on the plants collected from Myanmar. The tuber of the third species, *Typhonium praecox*, was sold at sightseeing places in the Kyaikhtiyo Wildlife Sanctuary, Mon State, for domestic medicinal use. It was cultivated to flower in Japan and recognized as a new species. It is characteristic that the flowering shoot does not have a foliage leaf so that the inflorescence appears above ground much earlier than the normal leaves.

Key words: *Araceae*, Myanmar, new species, *Typhonium cordifolium*, *Typhonium neogracile*, *Typhonium praecox*.

The genus *Typhonium* Schott (*Araceae*) includes about 80 species and is widely distributed in tropical and subtropical Asia, Africa, south Pacific regions and Australia. After the most recent revision of *Typhonium* (Sriboonma et al. 1994), many species have been described especially from Thailand and Vietnam (Hettterscheid and Boyce 2000, Hettterscheid et al. 2001, Hettterscheid and Nguyen 2001, Murata et al. 2002, Hattterscheid and Galloway 2006, Nguyen 2008), suggesting that Thailand and its neighboring areas are likely to be a center of diversity of the genus. For Myanmar, the western neighbour of Thailand, nine species of *Typhonium* including *T. venosum* (Aiton) Hett.

& P. C. Boyce that was recently transferred from *Sauromatum* Schott by Hettterscheid and Boyce (2000) were enumerated in the checklist of Myanmar plants by Kress et al. (2003). However, no critical consideration has been made for Myanmar *Typhonium*. Through our plant inventory project for contribution to the Flora of Myanmar (cf. Tanaka 2005), we have obtained good herbarium and living collections of *Typhonium*. Six species are recognized after identification, i.e., *Typhonium diversifolium* Wall. ex Schott, *T. horsfieldii* (Miq.) Steenis, *T. trilobatum* (L.) Schott, *T. cordifolium* S.Y. Hu and two new species *T. neogracile* J. Murata and *T. praecox* J. Murata to be described here. These

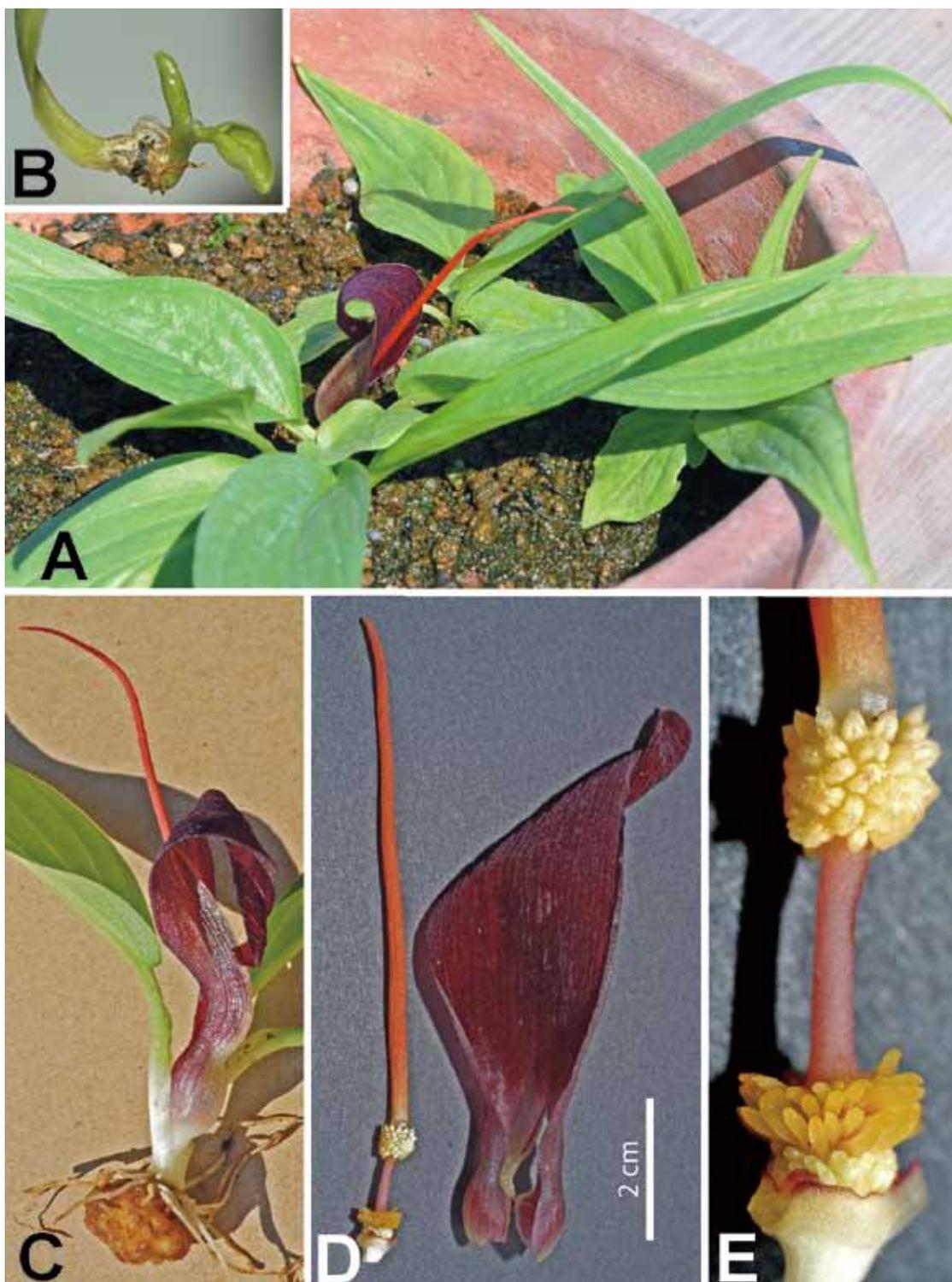


Fig. 1. *Typhonium cordifolium*. A, C. Habit. B. Adventitious bud at the mature leaf apex with two young leaves. D. Spadix and spathe cut to open. The spathe is ventrally velvety and with transverse weak veins. E. Spadix enlarged.

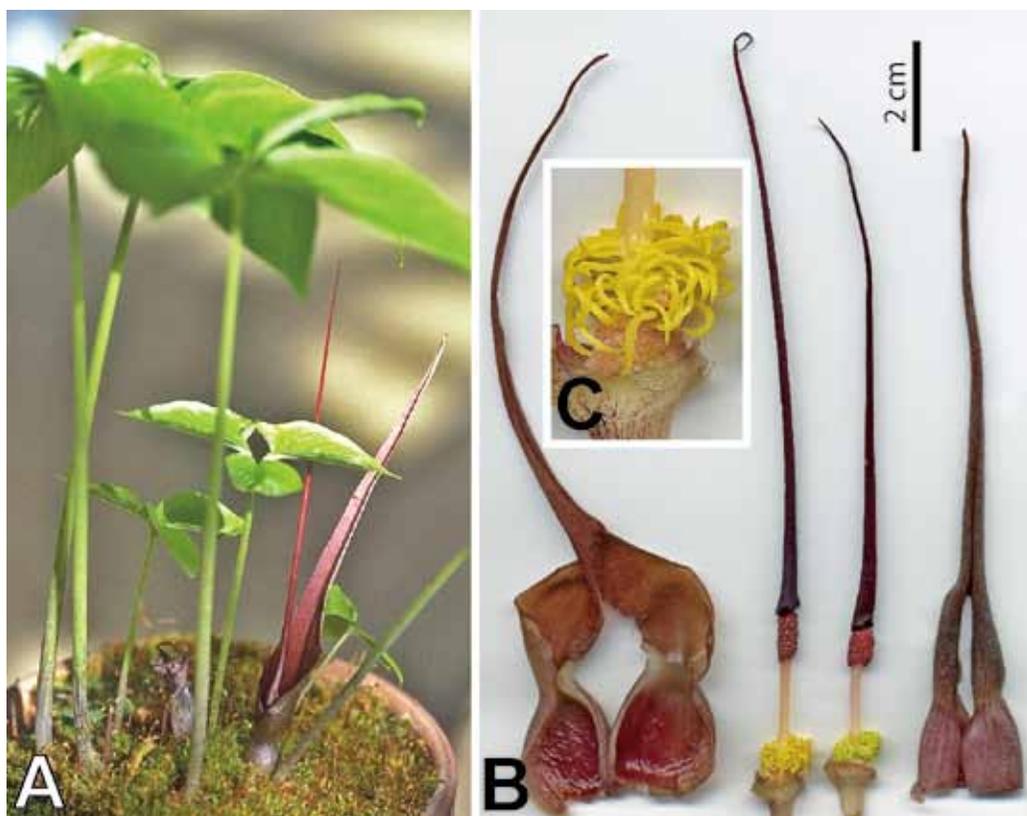


Fig. 2. *Typhonium neogracile*. A. Habit. B. Spathe cut open to show spadix of mature (left) and young (right) inflorescences. C. Sterile flowers enlarged.

species share a characteristic shoot organization, i.e., the stem type D of Murata (1990), in which an axillary bud forming the next continuation shoot is apparently encircled by the ultimate leaf of original shoot. Therefore they belong to sect. *Typhonium* in the sense of Sriboonma et al. (1994). This corresponds to the genus *Typhonium* in the narrowest sense based on a recent molecular phylogeny (Ohi-Toma et al. 2010).

1) ***Typhonium cordifolium*** S. Y. Hu in Dansk Bot. Ark. 23: 446 (1968). [Fig.1]

Tuber subglobose, 1–2 cm in diam. Axillary bud forming next continuation shoot apparently encircled by ultimate leaf of original shoot. Petiole short, 2.5–4 cm long, mostly sheathed, smooth (sometimes with a bulbil at the top of

sheath in Thai specimens); leaf blade narrowly ovate elliptic to narrowly elliptic (especially slender after flower), 4–25 cm long, 1.5–4 cm wide, acuminate, arched down on the ground, apex with a bulbil when mature. Inflorescence usually succeeding to two normal leaves, peduncle short (1–2 cm), not appearing above ground, spathe dark reddish purple to purplish brown, 6–8 cm long; tube 12 mm long, 10 mm in diam. constricted above, thick walled; blade upright or recurved and curled in upper part, 5–9 cm long, to 3 cm wide, narrowly triangular ovate, base convolute, acuminate above. Spadix as long as spathe; female zone shortly conical, 1.5 mm long, 5 mm wide, ovaries congested; sterile interstice above female zone ca. 10 mm long, lower 2 mm covered with sterile flowers; male zone 5 mm long, 6 mm wide; appendage

brick orange colored, cylindrical, 3.6–7.7 cm long, 1–2 mm wide, gradually narrowed above, base not truncate. Staminate flowers congested, anthers creamy white, thecae slightly mucronate. Sterile flowers dark yellow, cylindrical, obtuse, 2–3mm long, spreading.

Specimens examined: **MYANMAR**. Mandalay Division, Mt. Popa, Popa Mountain Park, Kyaukpadaung Township, upper central Myanmar 20°54' N, 95°15' E, 18 May 2006, Khin Myo Htwe 035070 (MBK, TI); cult. at the Botanical Gardens, Graduate School of Sciences, the University of Tokyo, from Myanmar, Popa Mountain Park, ca. 600m alt., 14 July 2005, Ohi-Toma 05071401 (TI); cult. at the Botanical Gardens, Graduate School of Sciences, the University of Tokyo, from Myanmar, Popa Mount Park, ca. 600m alt., 5 Aug. 2008, J. Murata 080810 (TI). **THAILAND**. Rachaburi, Thung Kang Yang, mixed evergreen forest. Spathe dark purple, 7 July, 1963, Larsen 10577 (C, holotype).

Since *Typhonium cordifolium* was described, it had been known only from Thailand but identical plants were newly found on Mt. Popa in Myanmar. On Mt. Popa the species from dense populations on sunny places around the edge of forests at middle elevations (Tanaka et al. 2006). It is dormant in dry season and flowers at the beginning of the rainy season. The leaves associated with the inflorescence are similar to those of the Thai specimens originally described but the leaves produced after flower are much longer and more slender (Fig. 1A). A single adventitious bud is clear at the apex of each leaf (Fig. 1B) and rooted to the ground.

In the last revision of *Typhonium* by Sriboonma et al (1994) this species was recognized as a synonym of *T. violifolium* Gagnep. However, detailed observation of the living plants of *T. cordifolium* in wild habitats and under cultivation revealed that this species produces an adventitious bud always at the apex of the leaves (and /or middle of petiole in Thai specimens) and never at the base of the leaf blade, which is distinct from typical *T. violifolium* (the lectotype from Kaw Samui Island in peninsular Thailand) that has an adventitious bud at the base of leaf blade. The

base of *T. cordatum* is shallowly cordate and the lobes never overlap each other but widely overlap in *T. violifolium*.

2) *Typhonium neogratile* J. Murata, sp. nov.

[Fig. 2]

Typhonium pottingeri Prain affinis sed inflorescentia toto minore et angustiore, floris sterilibus flavis (nec albis) differt.

Typus: Myanmar. Originally collected in Mandalay Division, Pyin Oo Lwin, alt. ca. 700m. Cultivated at the Bot. Gard. Univ. Tokyo. 30 March 2001, J. Murata 010309 (TI-holotype).

Typhonium gracile auct. non (Roxb.) Schott (1855): Hook. f., Fl. Brit. Ind. 6: 512 (1893); Engl., Pflanzenr. Ht. 73 (IV-23a): 120 (1920).

Arum gracile Roxb. Hort. Bengal.: 65 (1814), p.p., excl. type (Katu-shena, t. 21 in Hortus Malabaricus vol.11; lectotype here designated): Roxb., Fl. Ind. ed. 3: 505 (1832), p.p., excl. type; Wight, Ic. 2: t. 793 (1843).

Tuber subglobose, 1–2 cm in diam. Axillary bud forming next continuation shoot apparently encircled by ultimate leaf of original shoot. Petiole slender, to 25 cm long, smooth; leaf blade deeply trilobed or trifoliolate; mid lobe ovate to elliptic, apex acute, base cuneate and shortly petiolulate or decurrent to divaricate rachis, 4–6 cm long, 3–5 cm wide; lateral lobes distinctly petiolulate, as large as mid lobe, obliquely ovate, occasionally deeply bilobed again, lobe apex acute to acuminate. Inflorescence usually succeeding to two normal leaves, peduncle short, not appearing above ground, spathe purplish brown; tube 10–15 mm long, 10–12 mm in diam. constricted above, thick walled; blade upright or bent backward, very narrowly triangular, base convolute, long acuminate above, 10–13 cm long, 4 cm wide when open. Spadix as long as spathe; female zone shortly conical, 2–3 mm long, 5 mm wide, ovaries congested; sterile interstice above female zone ca. 20 mm long, lower 6 mm covered with sterile flowers; male zone 9 mm long 3 mm

wide; appendage red-purple, whip shaped, 10–13 cm long, 1–2 mm wide, base truncate to axis of male zone. Staminate flowers congested, anthers reddish purple. Sterile flowers yellow, hair-like, acute, variously curved, 4–6 mm long.

Specimen examined: **INDIA**. East Bengal (Khasia), Herb. Griffith (Kew distribution number 6000, K); Silhet, Wallich 8929B (K); Ferriaghat, Khasi Hills, March 1886, G. Mann s.n. (CAL). **MYANMAR**. Originally collected in Mandalay Division, Pyin Oo Luin, alt. ca. 700m. Cultivated at the Bot. Gard. Univ. Tokyo. 30 March 2001, J. Murata 010309 (TI).

Although this species has been treated as *Typhonium gracile*, this name is not applicable because the type (Katu-shena, t. 21 in Hortus Malabaricus vol.11, lectotype here designated) was revealed to be *Tacca leontopetaloides* (L.) Kuntze (Manilal et al. 1984, Manilal 2003). Therefore this species is re-described as *T. neogracile*. This species has been known only from Khasi Hill in North India. Hooker (1893) also cited a specimen from the Khashimir-Pakistan border, as “The Panjab, Jhelum River, *Aitchison*”, but this specimen has not been examined. We collected this species from a roadside at Pin-Oo-Luin, in central Myanmar. It is very similar to *T. pottingeri*, described from Northern Myanmar, but distinct in the color and morphology of sterile flowers, which are yellow and weakly curled in *T. neogracile* (Fig. 2C) but white and much curled (as in *T. trilobatum*) in *T. pottingeri*. The spathe of *T. neogracile* is much narrower than *T. pottingeri*.

3) *Typhonium praecox* J. Murata, sp. nov.

[Fig. 3]

Typhonium tubispathum Hett. & Galloway affinis sed floribus sterilibus subulatis (nec subclavatis non conoideis) differt.

Typus: MYANMAR. Tuber purchased at the Kyaikhtiyo Pagoda in Kyaikhtiyo Wildlife Sanctuary, Mon State, in Feb. 2007 and flowered at the Bot. Gard. Univ. Tokyo, 25 March 2008, J. Murata 0803251 (TI-holotype).

Tuber subglobose, 4–6 cm in diam. Axillary bud forming next continuation shoot apparently

encircled by ultimate leaf of original shoot. Petiole short, to 11 cm long, basal 1/3 sheathed, smooth; bulbil-like thickenings recognized at top of sheath when mature: leaf blade elliptic to narrowly elliptic, to 15 cm long, to 7 cm wide, acute. Inflorescence accompanying two cataphylls, appearing much earlier than normal leaves, peduncle short, not appearing above ground, spathe purplish brown to brown; tube 22 mm long, 12 mm in diam. constricted above, thick walled; blade recurve and curled in upper part, narrowly triangular ovate, base convolute, long acuminate above, 8–10 cm long, 3.5–4 cm wide at base when open. Spadix totally as long as spathe; female zone shortly conical, 2.5 mm long, 4 mm wide, ovaries congested; sterile interstice above female zone 22 mm long, lower 8 mm covered with sterile flowers; male zone 5 mm long, 3 mm wide; appendage brown, very narrowly conical, base truncate. Staminate flowers congested, anthers yellow, thecae slightly mucronate. Sterile flowers orange-yellow, basally whitish, cylindrical, subulate, 2–2.5 mm long, spreading and slightly downcurved.

The tubers of *T. praecox* with young inflorescence (Fig. 3A) were sold at the sightseeing places in the Kyaikhtiyo Wildlife Sanctuary, Mon State, for domestic medicinal use. Some samples were purchased and cultivated to flower in Japan. This species seems to be dormant in the dry season and extends one to several inflorescences, each subtended by two cataphylls, at the end of dry season. The shoot (sympodial unit) with normal leaves extends after flowering in rainy season (Fig. 3E). This type of shoot organization is rather rare in *Typhonium* but known in *T. hayatae* Sriboonma & J. Murata (Sriboonma et al 1994), *T. adnatum* Hett. & Sookch., *T. echinulatum* Hett. & Sookch., *T. gallowayi* Hett. & Sookch. (Hetterscheid et al. 2001) and *T. tubispathum* Hett. & Galloway (Hetterscheid and Galloway 2006). *Typhonium praecox* is most similar to *T. tubispathum* in having elliptic leaves not cordate at the base but distinct in the subulate sterile

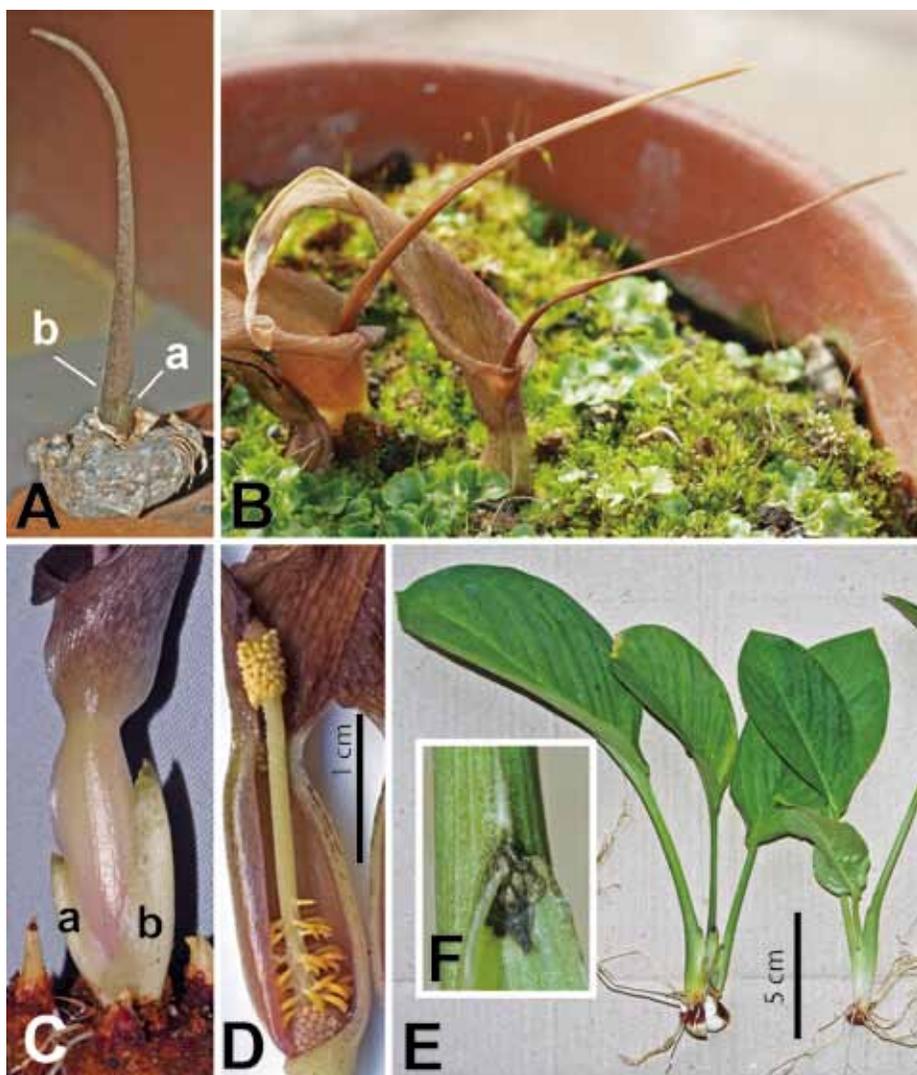


Fig. 3. *Typhonium praecox*. A. Tuber with young inflorescence that is subtended by two cataphylls (a and b). B. Flowering habit. C. Spathe tube subtended by two cataphylls (a and b). D. Spathe tube cut open to show the arrangement of female, sterile and male flowers. E. Plants with normal leaves after flowering season. F. Top part of the leaf sheath of a normal leaf with apparent adventitious buds.

flowers (Fig. 3D). *Typhonium praecox* is also characteristic in having bulbil-like attachments at the top of the leaf sheath (Fig. 3F), although they have not been seen to produce functional adventitious buds.

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邑田 仁^a, 大井(東馬) 哲雄^a, 田中伸幸^b: ミャンマー植物についての新知見 (4) *Typhonium cordifolium* および 2 新種 *T. neogracile* と *T. praecox* (サトイモ科, リュウキュウハング属)

ミャンマーの植物多様性調査により発見したリュウキュウハング属 3 種について報告する。いずれもミャンマー新産であり、また、花後に伸びる仮軸が花序に最も近い葉の内側から出る点で共通しており *Typhonium* 節に所属する。

T. cordifolium はタイ国のラチャブリー (バンコクの西) から記載された種で、それ以外の明確な産地は知られていない。ミャンマーでは中西部のポパ山中腹の林縁に群生しているのが発見された。乾期には地上部がなく、雨期の始めに開花する。ミャンマーのものは開花時には原記載とよく一致するが、花後に出る葉はより細長くなる傾向があり、葉先に不定芽を生じ、地面につくと子苗となって繁殖する。

T. neogracile は北インドの Khashi Hill に分布することが知られ、*T. gracile* と呼ばれてきたが、これまでに採集された標本はきわめて少ない。最近、*T. gracile* のタイプがタシロイモ属の植物であることが明らかにされた (Manilal et al. 1984, Manilal 2003) ためこの学名は本種に適用できず、新種として再記載することが必要となった。Hooker の *Flora of British India* では “The Panjab,

Jhelum River, Aitchison” (カシミールとパキスタンの国境あたり) という標本が引用されているが、確認できていない。ミャンマーでは中部のピンウーリンの道路脇で発見された。ミャンマー北部のミッチーナから採集され記載された *T. pottingeri* に似ているが、花序が全体に小さく、細身で、縮れた退化花は黄色である (白色でない) 点で異なる。

T. praecox はチャイティーヨ自然保護区の土産店で薬用として球茎が売られていた。乾期には地上部は枯れ、乾期の終わりに鞘状葉のみを伴う花序を地上に出し、その後、普通葉のあるシュートを伸ばす。このような特徴は希なもので、ラオス産の *T. hayatae* と同等であり、タイ国産の *T. adnatum*, *T. echinulatum*, *T. gallowayi* (以上 Hettetscheid et al. 2001) および *T. tubispathum* (Hettetscheid 2006) にも知られている。このうち *T. praecox* は退化花が倒披針形でまばらにつくことで独特であるが、葉身が楕円形である点では *T. tubispathum* に似ている。なお、葉鞘の上端内側に不定芽と見られるものが集まってつくが、このような特徴は他種で指摘されたことがなく、それらが子苗に発達するかどうか不明である。

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