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A New Species of the Genus of *Alpinia* (*Alpinia graminifolia* D. Fang & G.Y. Lo) Recorded for Vietnam's Flora

Nghiem Duc Trong[1], Nguyen Quoc Binh[2,*], Tran Van On[1], Nguyen Phuong Hanh[3], Nguyen Trung Thanh[4]

[1]*Hanoi University of Pharmacy, 13-15 Le Thanh Tong, Hoan Kiem, Hanoi, Vietnam*

[2]*Vietnam National Museum of Nature, VAST, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam*

[3]*Institute of Ecology and Biological Resources, VAST, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam*

[4]*Faculty of Biology, VNU University of Science, 334 Nguyen Trai, Thanh Xuan, Hanoi, Vietnam*

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Abstract: The genus of *Alpinia* Roxb, with about 250 species worldwide and 35 species in Vietnam, is one of the largest genera of the Zingiberaceae family. Many species of *Alpinia*, such as *Alpinia oblongifolia* and *Alpinia oxyphylla*, are used in Vietnamese traditional medicine. In this research, *Alpinia graminifolia*, a new species discovered in the mountains of Northern Vietnam (Quang Ninh province and Bac Giang province), was recorded for Vietnam's flora. The specimens collected in Uong Bi City, Thuong Yen Cong commune, Mount Yen Tu (Quang Ninh province) and Son Dong district, Thanh Luan commune (Bac Giang province), are deposited at Vietnam National Museum of Nature (VNMN), the herbarium of Hanoi University of Pharmacy (HNIP), and the herbarium of the Institute of Ecology and Biological Resources (HN).

Keywords: Paddy galangal, smaller galangal, Zingiberaceae.

1. Introduction

Genus Alpinia Roxb. is a rather large big genus in the ginger family (Zingiberaceae), with about 250 species, distribution in the tropics and subtropics from Asia to Australia and the Pacific Islands [1-3]. Up to now, there are 35 species of Alpinia was known in Vietnam [4]. Some new record species and new species have been discovered in Vietnam recently such as Alpinia polyantha D. Fang [5], Alpinia rugosa S.J. Chen & Z.Y. Chen [6], Alpinia newmanii N.S. Ly [7]. Many species in this genus are used as medicine in traditional medicine in Vietnam and other countries such as Alpinia oblongifolia, Alpinia oxyphylla,... During the investigation of species in the genus Alpinia in Quang Ninh province (Yen Tu mountain, Thuong Yen Cong commune, Uong Bi City), Bac Giang province (Thanh Luan

*Corresponding author. Tel.: 84-914373627.
Email: thanhntsh@gmail.com

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commune, Son Dong dist.) (Vietnam), we have discovered a species belong to genus Alpinia which called is Riềng héo by local people. After compared morphological characteristics of this species with the original description of D. Fang & G.Y. Lo (1978) [8], showed this species is Alpinia graminifolia D. Fang & G.Y. Lo. This new record species for Vietnam flora, so far there are not documents yet mention to this species in Vietnam. Based on species adjectives (graminifolia) and leaves almost like paddy leaves, we suggest that the Vietnamese name of this species is Riềng lúa (paddy galangal).

2. Materials and methods

Materials for research were collected at Yen Tu mountain (Uong Bi, Quang Ninh) and Son Dong District (Bac Giang). These specimens are stored at the Biological Department of the Vietnam Museum of Nature (VNMN), Hanoi University of Pharmacy (HNIP) and Herbarium of Institute of Ecology and Biological Resources (HN).

The scientific name is determined by means of morphological, comparised with plant documents, and specimens kept at the Kunming Institute of Botany (KUN), Guangxi Medicinal Garden (GXMG), Guangxi Institute of Botany (IBK).

3. Results and discussion

Vietnamese name: Riềng lúa, Riềng lá hẹp, Riềng héo.

Science name: *Alpinia graminifolia* D. Fang & G.Y. Lo, 1978. Acta Phytotax. Sin. 16(4): 78.

Characteristics: Herbs growing into a thick crowd, rhizomes branched much, about 1 cm in diameter. Pseudostem 1,2-1,8 m high, slender, base 0.8-1 cm diameter, 6-15 leaves. Leaves usually sessile; lamina linear, ca 15-55 × 1-2.5 cm, glabrous, adaxially deep glaucous-green, abaxially light green, leaf margin slightly curved down, cuneate at base, apex long acuminate; ligule small, 4-7 mm long, apex split into two shallow lobes, apex acuminate, margin ciliate. Inflorescence raceme, terminal, erect, unbranched, 8-12 cm long, rachis pubescent; flowers solitary or paired on rachis, flower sparse below the rachis, thicker above. Bracts soon caducous, bracteoles very small. Pedicel 1-2 mm long, pubescent. Calyx narrowed campanulate, 1-1.3 cm long, white-yellow ivory, split on 1 side down 5-6 mm, abaxially puberulent, apex 3-toothed. Corolla white, corolla tube 1.5-1.7 cm long, under the cylinder, 2 mm wide, gradually dilate above, 4 mm wide, glabrous; divided into three lobes at part above, lobes oblong, concave, adaxially densely pubescence, abaxially glabrous, dorsal lobe oblong ca 9-11 × 4-5 mm; two lateral lobes smaller, ca 9-10 × 3 mm; labellum wide ovoid or almost round, ca 1.4-1.6 cm in diameter, bright yellow with two dark red blotch triangular at base of two sides midvein and red stripes radiating from base midvein toward the apex, two margin near apex slightly concave, apex labellum waved; lateral staminodes subulate, 7-8 mm long, reddish brown, slight curved; filament green-yellow, glabrous, slight curved, grooved along the inside, ca 8-10 × 2 mm; anthers 2, arrangement following the V-form, 4-5 mm long; connective extends upward into the triangular crest, 2-3 mm high, higher than the stigma, light green. Style filiform, 3.5-3.7 cm, white, glabrous bottom, sparsely tomentose above. Epigynous glands 2, 1-2 mm long, light yellow, glabrous. Ovary oblong, ca 3 × 2 mm, puberulent, green-white, 3-locular; placentation axile. Fruit globose, red maturing, 1-1,2 cm in diameter, calyx exists on the top. Flowering March - May, fruiting May - June (Fig. 1).

Habitat: Grows in secondary forests, under the canopy, at an altitude of 400-800m.

Phenology: Pseudostem 1.2-1.8 m high, slender, base 0,8-1 cm in diameter, leaf blade linear, ca 15-55 × 1-2,5 cm. Flowering March to May, fruiting May to June.

Distribution: New distributed points found in Vietnam are Quang Ninh province (Yen Tu

moutain) and Bac Giang province (Son Dong Dist.), 800m above sea level. China (Guangxi).

Specimens: Vietnam: Quang Ninh province, Uong Bi Dist., Thuong Yen Cong commune, Yen Tu mountain, 800 m a.s.l., 19 May 2013, Nghiem Duc Trong, YT-71 (HNIP, VNMN); Bac Giang province, Son Dong Dist., Thanh Luan commune, 29 May 2016, Nguyen Quoc Binh SH 94 (HNIP, VNMN); Bac Giang province, Son Dong Dist., Thanh Luan commune, Do Van Hai, TV_0309 (HN).

Use name: The rhizome is used to heal fever or make spice.

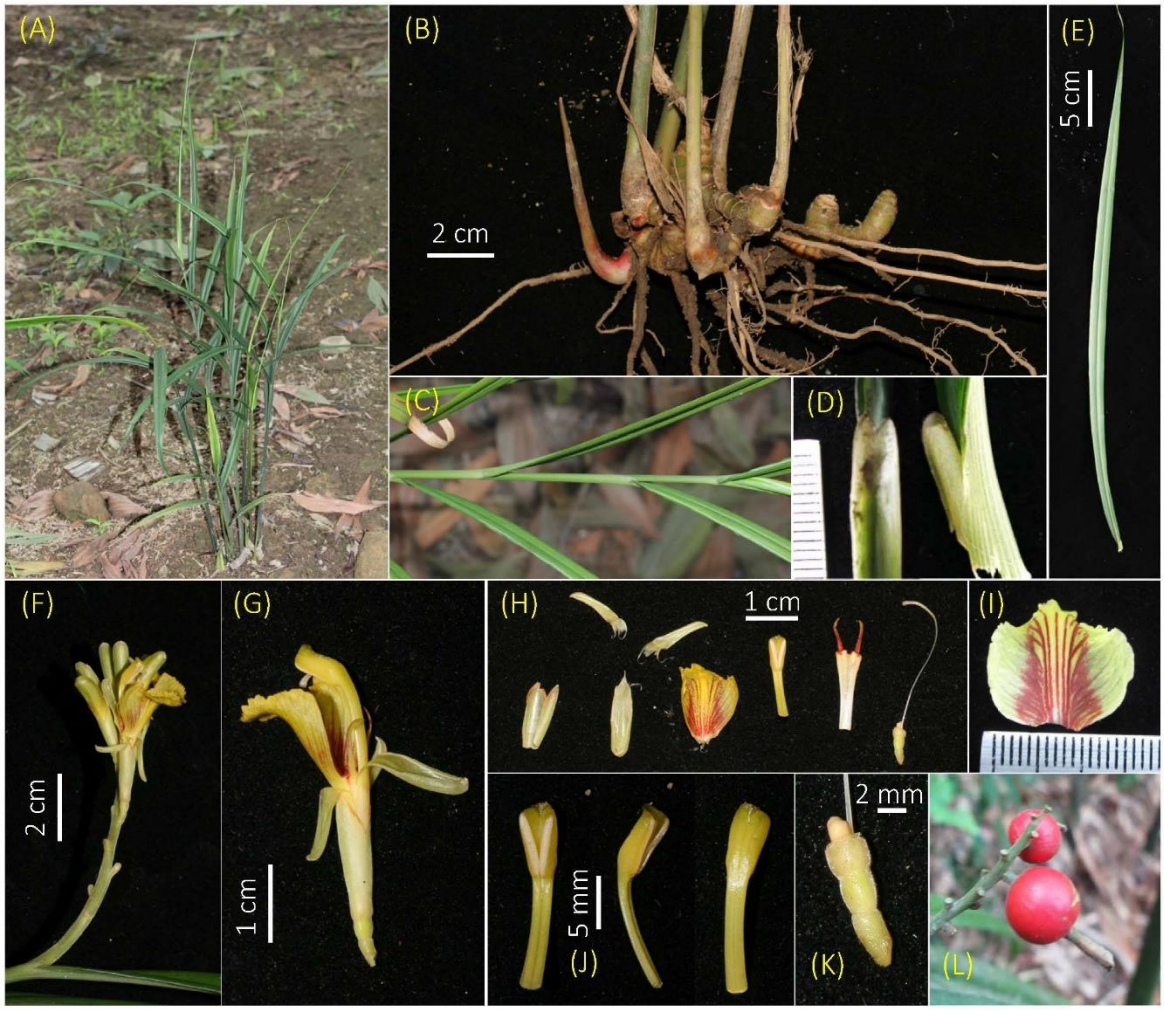

Fig. 1. *Alpinia graminifolia* D. Fang & G.Y. Lo: A. Habit; B. Rhizomes; C. Pseudostem with leaves; D. Ligule; E. Leaves; F. Inflorescence, G. Flower; H. Flower dissection (from left)*:* Calyx, three corolla lobes, labellum, filament and anthers, two lateral staminodes and corolla tube, ovary - epigynous glands - style - stigma; I. Labellum; J. Filament and anthers (from left): front, side, backside; K. Ovary and two epigynous glands; (L) Fruits. Photos: Nghiem Duc Trong (A-H,J,K); Nguyen Quoc Binh (I, L) .

Comparison of characteristics of *Alpinia graminifolia* with some species in the same Sect. *Alpinia* Subsect. *Alpinia* also showed differences (Table 1).

Compared with other species in Table 1, *Alpinia graminifolia* can be distinguished by it's leaf lamina very long and narrow.

Table 1. Comparison of characteristics of *Alpinia graminifolia* with some species in the same Sect. *Alpinia* Subsect. *Alpinia*

Name science	Lamina (cm)		Ligule (mm)	Apex of ligule	Filament and anthers	Anther crest
	Long	Wide				
A. graminifolia	15-50	1.0-2.5	04-07	Two lobes, apex acuminate	Twice as long than anthers	Triangular
A. gagnepainii	40-45	4.0-6.0	12-15	Apex obtuse	Shorter than anthers	0
A. officinarum	20-35	1.5-2.5	15-30	Apex acuminate	Twice as long than anthers	0
A. oxymitra	27-40	3.0-5.0	03-05	Entire	1.5 times longer than anthers	Oval-obtuse
A. oxyphylla	25-35	3.0-6.0	05-20	Two lobes, apex round	3 times longer than anther	0

4. Conclusion

New record species, *Alpinia graminifolia* D.Fang & G.Y. Lo for Vietnam Flora, up to now, there are 36 species of genus *Alpinia* Roxb. known from Vietnam.

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Bổ sung một loài trong chi Riềng (*Alpinia graminifolia* D. Fang & G.Y. Lo) cho hệ thực vật Việt Nam

Nghiêm Đức Trọng[1], Nguyễn Quốc Bình[2], Trần Văn Ơn[1], Nguyễn Phương Hạnh[3], Nguyễn Trung Thành[4]

[1]*Trường Đại học Dược Hà Nội, 13-15 Lê Thánh Tông, Hoàn Kiếm, Hà Nội, Việt Nam*

[2]*Bảo tàng Thiên nhiên Việt Nam, VHLKH&CNVN, 18 Hoàng Quốc Việt, Cầu Giấy, Hà Nội, Việt Nam*

[3]*Viện Sinh thái và Tài nguyên sinh vật, VHLKH&CNVN, 18 Hoàng Quốc Việt, Cầu Giấy, Hà Nội, Việt Nam*

[4]*Khoa Sinh học, Trường Đại học Khoa học Tự nhiên, 334 Nguyễn Trãi, Thanh Xuân, Hà Nội, Việt Nam*

Tóm tắt: Chỉ Riềng (*Alpinia* Roxb.) là một chi lớn trong họ Gừng (Zingiberaceae), với khoảng 250 loài trên thế giới và 35 loài Riềng ở Việt Nam. Nhiều loài Riềng đã được sử dụng trong Y học cổ truyền Việt Nam như *Alpinia oblongifolia*, *Alpinia oxyphylla*,... Trong bài báo này, *Alpinia graminifolia* - một loài bổ sung mới cho hệ thực vật Việt Nam đã được phát hiện ở vùng núi phía bắc Việt Nam (Quảng Ninh và Bắc Giang). Mẫu vật được thu thập ở tỉnh Quảng Ninh (thành phố Uông Bí, xã Thượng Yên Công, vùng núi Yên Tử) và Bắc Giang (huyện Sơn Động, xã Thanh Luận), được lưu giữ tại Bảo tàng Thiên nhiên Việt Nam (VNMN), phòng tiêu bản Trường Đại học Dược Hà Nội (HNIP) và phòng tiêu bản Viện Sinh thái và Tài nguyên sinh vật (HN).

Từ khóa: Riềng lúa, Riềng héo, họ Gừng (Zingiberaceae).