

Critical notes on *Spiradiclis purpureocaerulea* H. S. Lo (Rubiaceae) from Vietnam

Yi-Hua TONG, Nian-He XIA, Lei WU & Tien Chinh VU

DIRECTEUR DE LA PUBLICATION / *PUBLICATION DIRECTOR*: Bruno David
Président du Muséum national d'Histoire naturelle

RÉDACTEUR EN CHEF / *EDITOR-IN-CHIEF*: Thierry Deroin

RÉDACTEURS / *EDITORS*: Porter P. Lowry II; Zachary S. Rogers

ASSISTANT DE RÉDACTION / *ASSISTANT EDITOR*: Emmanuel Côté (adanson@mnhn.fr)

MISE EN PAGE / *PAGE LAYOUT*: Emmanuel Côté

COMITÉ SCIENTIFIQUE / *SCIENTIFIC BOARD*:

P. Baas (Nationaal Herbarium Nederland, Wageningen)
F. Blasco (CNRS, Toulouse)
M. W. Callmender (Conservatoire et Jardin botaniques de la Ville de Genève)
J. A. Doyle (University of California, Davis)
P. K. Endress (Institute of Systematic Botany, Zürich)
P. Feldmann (Cirad, Montpellier)
L. Gautier (Conservatoire et Jardins botaniques de la Ville de Genève)
F. Ghahremaninejad (Kharazmi University, Téhéran)
K. Iwatsuki (Museum of Nature and Human Activities, Hyogo)
K. Kubitzki (Institut für Allgemeine Botanik, Hamburg)
J.-Y. Lesouef (Conservatoire botanique de Brest)
P. Morat (Muséum national d'Histoire naturelle, Paris)
J. Munzinger (Institut de Recherche pour le Développement, Montpellier)
S. E. Rakotoarisoa (Millenium Seed Bank, Royal Botanic Gardens Kew, Madagascar Conservation Centre, Antananarivo)
É. A. Rakotobe (Centre d'Applications des Recherches pharmaceutiques, Antananarivo)
P. H. Raven (Missouri Botanical Garden, St. Louis)
G. Tohmé (Conseil national de la Recherche scientifique Liban, Beyrouth)
J. G. West (Australian National Herbarium, Canberra)
J. R. Wood (Oxford)

COUVERTURE / *COVER*:

Réalisée à partir des Figures de l'article/*Made from the Figures of the article*.

Adansonia est indexé dans / *Adansonia is indexed in*:

- Science Citation Index Expanded (SciSearch®)
- ISI Alerting Services®
- Current Contents® / Agriculture, Biology, and Environmental Sciences®
- Scopus®

Adansonia est distribué en version électronique par / *Adansonia is distributed electronically by*:

- BioOne® (<http://www.bioone.org>)

Adansonia est une revue en flux continu publiée par les Publications scientifiques du Muséum, Paris
Adansonia is a fast track journal published by the Museum Science Press, Paris

Les Publications scientifiques du Muséum publient aussi / *The Museum Science Press also publish*: *Geodiversitas*, *Zoosystema*, *Anthropozoologica*, *European Journal of Taxonomy*, *Naturae*, *Cryptogamie* sous-sections *Algologie*, *Bryologie*, *Mycologie*, *Comptes Rendus Palevol*

Diffusion – Publications scientifiques Muséum national d'Histoire naturelle
CP 41 – 57 rue Cuvier F-75231 Paris cedex 05 (France)
Tél.: 33 (0)1 40 79 48 05 / Fax: 33 (0)1 40 79 38 40
diff.pub@mnhn.fr / <http://sciencepress.mnhn.fr>

© Publications scientifiques du Muséum national d'Histoire naturelle, Paris, 2020
ISSN (imprimé / *print*): 1280-8571/ ISSN (électronique / *electronic*): 1639-4798

Critical notes on *Spiradiclis purpureocaerulea* H. S. Lo (Rubiaceae) from Vietnam

Yi-Hua TONG
Nian-He XIA

Key Laboratory of Plant Resources Conservation and Sustainable Utilization,
Guangdong Provincial Key Laboratory of Digital Botanical Garden, South China Botanical Garden,
Center of Conservation Biology, Core Botanical Gardens, Chinese Academy of Sciences (China)
yh-tong@scbg.ac.cn
nhxia@scbg.ac.cn

Lei WU

College of Forestry
Central South University of Forestry and Technology, Changsha Department of Science (China)
wuleiibk@163.com (corresponding author)

Tien Chinh VU

Vietnam National Museum of Nature & Graduate University of Science and Technology
Vietnam Academy of Science and Technology (Vietnam)
tienchinhvu@gmail.com

Submitted on 7 February 2020 | accepted on 15 June 2020 | published on 14 December 2020

Tong Y.-H., Xia N.-H., Wu L. & Vu T. C. 2020. — Critical notes on *Spiradiclis purpureocaerulea* H. S. Lo (Rubiaceae) from Vietnam. *Adansonia*, sér. 3, 42 (19): 291-296. <https://doi.org/10.5252/adansonia2020v42a19>. <http://adansonia.com/42/19>

ABSTRACT

Based on a careful examination of the voucher specimens, the newly recorded *Spiradiclis purpureocaerulea* H. S. Lo from Vietnam was confirmed to be a misidentification of *S. coccinea* H. S. Lo. Coincidentally, *Spiradiclis coccinea* is a species previously known only from China, and represents a new record for the flora of Vietnam. True specimens of *S. purpureocaerulea* were collected by the authors in Thanh Hoa Province (Vietnam) in 2017. Therefore, we report *S. coccinea* and *S. purpureocaerulea* as new records for the flora of Vietnam here. Detailed descriptions and color photographs of the two species and a key to the five species of *Spiradiclis* in Vietnam are also provided.

KEY WORDS
Misidentification,
Vietnam,
new records.

RÉSUMÉ

Notes critiques sur Spiradiclis purpureocaerulea H. S. Lo (Rubiaceae) from Vietnam.

Un examen minutieux des spécimens de référence a permis de confirmer que le nouveau signalement de *Spiradiclis purpureocaerulea* H. S. Lo au Vietnam correspondait à une erreur d'identification d'un spécimen de *S. coccinea* H. S. Lo. *Spiradiclis coccinea* est une espèce qui n'était connue auparavant que de Chine et qui représente un signalement nouveau pour la flore du Vietnam. Des spécimens réels de *S. purpureocaerulea* ont été collectés par les auteurs dans la province de Thanh Hoa (Vietnam) en 2017. Par conséquent, nous signalons pour la première fois ici *S. coccinea* et *S. purpureocaerulea* pour la flore du Vietnam. Des descriptions détaillées et des photographies en couleur des deux espèces ainsi qu'une clé des cinq espèces de *Spiradiclis* au Vietnam sont également fournies.

MOTS CLÉS
mauvaise identification,
Viêt-Nam,
signalements nouveaux.

INTRODUCTION

The genus *Spiradiclis* Blume is a poorly known, taxonomically complicated genus distributed in tropical and subtropical regions of Asia (Lo *et al.* 1983; Lo 1999; Wang 2002; Chen & Taylor 2011; Wang *et al.* 2015; POWO 2019). It comprises approximately 54 species worldwide and most representatives are herbs occurring in limestone areas (Wang 2002; Chen & Taylor 2011; Wen *et al.* 2019; Wu *et al.* 2019). In Vietnam, this genus was traditionally represented by only two species, i.e. *Spiradiclis caespitosa* Blume and *S. leptobotrya* Pit. (Pitard 1923; Hô 2000; Deng 2014).

Recently, Lee *et al.* (2019) reported two new records of *Spiradiclis* for the flora of Vietnam, i.e. *S. hainanensis* H. S. Lo and *S. purpureocaerulea* H. S. Lo, both of which were previously thought of as endemic to China (Chen & Taylor 2011). However, we found that the description of *S. purpureocaerulea* in Lee *et al.* (2019) was not consistent with the plant depicted in Figure 3 of their article. The indumentum on most portions of the plant was described as densely pubescent, but the color pictures showed that the plant is glabrous or subglabrous. The description of the leaf shape was also conflicting with that in Figure 3A. Thus, we consulted the collector of the only cited collection (*N. S. Khang 708*) of this species, Dr N. S. Khang, and with his kind help, we examined the specimen kept in HN. After a careful specimen comparison, we found that this collection, identified as *Spiradiclis purpureocaerulea*, was very different from the type specimen (Fig. 2), and that many characters, especially the indumentum and leaf blade shape, match *S. coccinea* H. S. Lo (Fig. 3). Thus, we drew the conclusion that the specimen *N. S. Khang 708* belongs to *S. coccinea*. Coincidentally, *Spiradiclis coccinea* is a species previously only known from China and never reported from Vietnam before.

We also collected true specimens of *S. purpureocaerulea* during a field trip to Thanh Hoa Province (Vietnam) in 2017. Therefore, we report two new records for the flora of Vietnam here. Detailed descriptions of *S. coccinea* and *S. purpureocaerulea*, mainly based on material from Vietnam, and color photos of the two species are provided.

SYSTEMATICS

Family RUBIACEAE Juss.

Genus *Spiradiclis* Blume

Spiradiclis purpureocaerulea H. S. Lo
(Figs 1A-C; 2)

Bulletin of Botanical Research, Harbin 6 (4): 39 (1986).

TYPE SPECIMEN. — **China.** Guangxi: Longzhou County, Shangjin Town, roadside, on lime stone, 15.VIII.1935, *S. P. Ko 55507* (holo-, IBSC [IBSC 0510671]!; iso-, IBK [IBK 00191520]!)

SPECIMEN DATA. — **Vietnam.** Thanh Hoa: Phu Luong Nature Reserve, Thanh Cong District, on limestone hills, 20°29'29"N, 105°8'26"E, alt. 576 m, 23.X. 2017, *N. H. Xia et al. TYH-1281* (IBSC).

DESCRIPTION

Perennial herbs, 15–30 cm tall; stems ascending, densely pubescent, hairs brown. Leaves subsessile; blade ovate to ovate-elliptic, 3–9 × 1–4 cm, drying papery, adaxially dark green and densely strigose-hispidulous, abaxially pale green and densely pubescent; apex acute to obtuse; base rounded or obtuse, usually decurrent; secondary veins 7–13 on each side of the midrib; stipules subulate-triangular, 1–3 mm long, pubescent on both surfaces, apex caudate-acuminate, 0.5–1.5 mm long. Inflorescence congested-cymose, terminal, 5–13-flowered; peduncle up to 6 mm, densely pubescent; bracts subulate-triangular, 1.5–3.5 mm long, pubescent on both surfaces. Flowers distylous. Calyx with unicellular and white pubescence outside; hypanthium obconic-globose, *c.* 2 mm long; calyx lobes narrowly triangular, 3.5–4.5 mm long. Corolla purple red, slenderly salverform, puberulent outside; tube 1.9–2.4 cm long; lobes broadly ovate, *c.* 6 mm long, obtuse; stamens 5; stigma bilobed; ovary 2-celled, ovules numerous in each cell on peltate axile placentas attached to middle of septum. Long-styled flowers: corolla tube inside with pilose ring above stamens; filaments *c.* 2.6 mm long, adnate to the base of the corolla tube; anthers linear, *c.* 3 mm long; style 11–14 mm long, glabrous; stigmas positioned at 2/3 of the corolla tube, lobes linear-oblong, *c.* 2.8 mm long. Short-styled flowers: corolla tube inside with pubescence near the base; filaments 11–14 mm long, adnate to the corolla tube; anthers linear, *c.* 3.5 mm long, positioned somewhat above the middle of corolla tube to the level of the throat; style 2–3 mm long, glabrous; stigmas included near the base of the corolla tube, lobes lanceolate, *c.* 2 mm long. Capsules subglobose, 4–4.5 mm in diam., densely pubescent, opening into 4 valves. Seeds many, angular. Flowering August–October, fruiting October–November.

Spiradiclis coccinea H. S. Lo
(Figs 1D-F; 3)

Bulletin of Botanical Research, Harbin 6 (4): 38 (1986).

S. purpureocaerulea auct. non H. S. Lo, Lee *et al.*, *Korean Journal of Agricultural Science* 46 (3): 647, fig. 3 (2019).

TYPE SPECIMEN. — **China.** Guangxi: Longzhou County, Wulian Town, Banbi Village, dense forest, on rocks, 4.VIII. 1957, *S. H. Chun 13475* (holo-, IBSC [IBSC 0510628]!; iso-, IBK [IBK 00191517]!)

SPECIMEN DATA. — **Vietnam.** Ninh Binh: Nho Quan District, Forest Control Point, 20°16'28"N, 105°40'57"E, alt. 400 m, 17.VI. 2014, *N. S. Khang 708* (HN). — Ha Nam: Kien Khe District, 20°29'12"N, 105°52'9"E, alt. 198 m, on limestone hills, 3.VI. 2019, *N. H. Xia et al. TYH-2163* (IBSC).

DESCRIPTION

Perennial herbs, to 20 cm tall; stems erect, glabrous or subglabrous. Leaves shortly petiolate; petioles 1–2 mm long; blade narrowly elliptic-oblong or elliptic-oblong, 4–8 × 1.3–3 cm, drying papery, glabrous on both surfaces, adaxially dark green, abaxially pale green, apex obtuse to acute, base cuneate, secondary veins 5–9 on each side of the midrib; stipules triangular, 3–5 mm long, 2–3 mm wide at base, apex acute to long acuminate, 0.5–1.5 mm long. Inflorescence congested-cymose, terminal,



FIG. 1. — **A-C**, *Spiradiclis purpureocaerulea* H. S. Lo: **A**, habit; **B**, brevistylous flower, top view; **C**, flower, lateral view; **D-F**, *S. coccinea* H. S. Lo: **D**, flower, lateral view; **E**, longistylous flowers, top view; **F**, habit

8-12-flowered or more, glabrous; peduncle usually 0.5-5 mm long, glabrous; bracts subulate-triangular, 0.5-1.5 mm long, glabrous on both surfaces. Flowers distylous. Calyx glabrescent; hypanthium portion obconic, 1.2-2 mm long; lobes narrowly lanceolate, 1.7-3 mm long. Corolla dark red or purple red,

slenderly salverform, glabrous or puberulent outside; tube 1.5-2.4 cm; lobes broadly ovate to suborbicular, 4.5-6 mm long, apex acute; stamens 5; stigma bilobed; ovary 2-celled, ovules numerous in each cell on peltate axile placentas attached to middle of septum. Long-styled flowers: corolla tube inside with

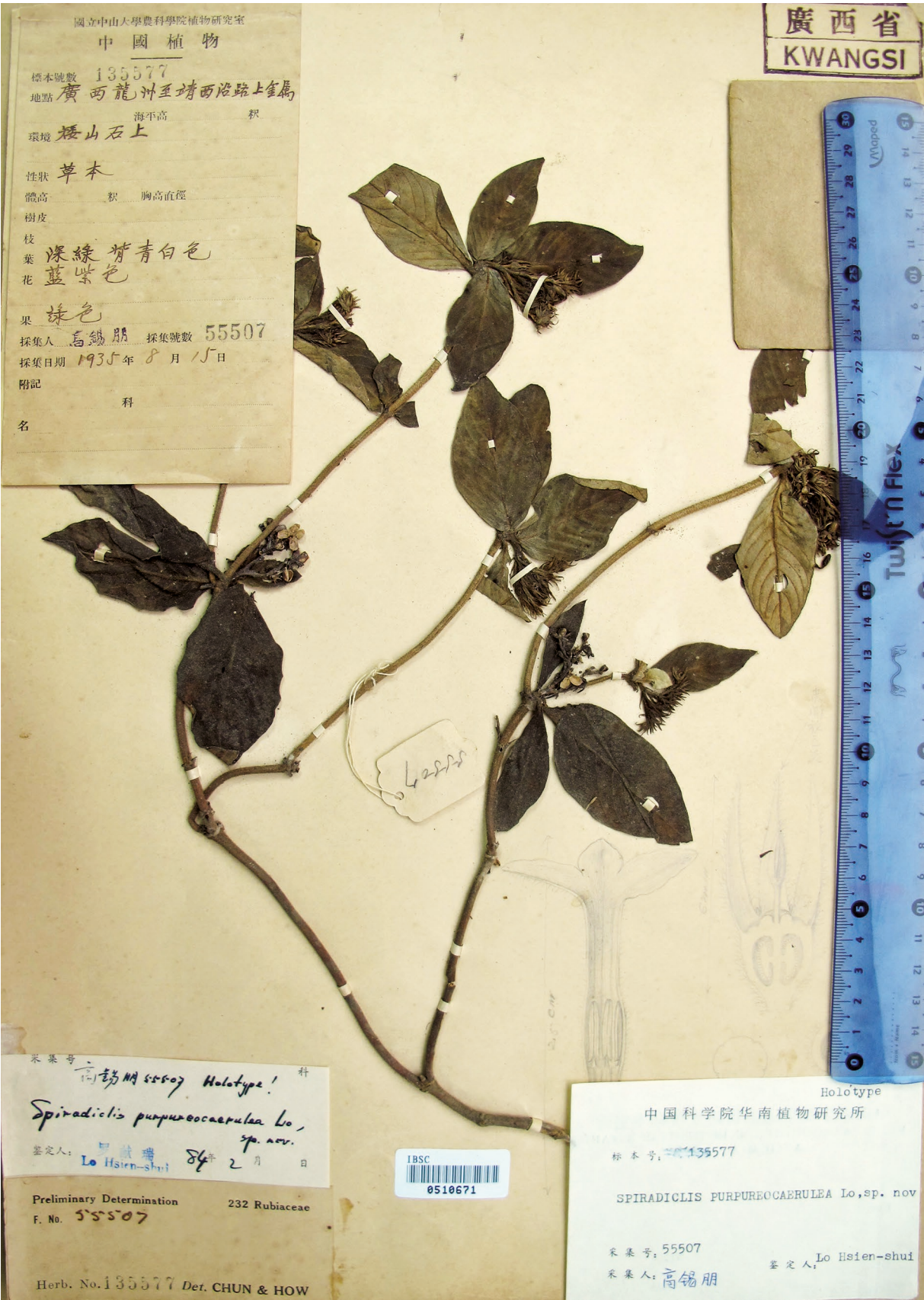


Fig. 2. — Holotype of *Spiradiclis purpureocaerulea* H. S. Lo, S. P. Ko 55507 (IBSC 0510671).



FIG. 3. — Holotype of *Spiradiclis coccinea* H. S. Lo, S. H. Chun 13475 (IBSC 0510628).

pilose ring above stamens; filaments 1.5–2.5 mm long, adnate to the base of the corolla tube; anthers linear, *c.* 3 mm long, positioned near the base of the corolla tube; style 1.2–1.5 mm long, glabrous; stigmas positioned a little below the throat of the corolla tube, lobes linear-oblong, *c.* 2.4 mm long. Short-styled flowers: corolla tube inside with dense pubescence near the base; filaments 9–13 mm long, adnate to the corolla tube; anthers linear, *c.* 3 mm long, positioned at $\frac{2}{3}$ of the corolla tube; style *c.* 2 mm long, glabrous; stigmas included near the base of the corolla tube; lobes lanceolate, *c.* 1.8 mm long. Capsules subglobose, 4–4.5 mm in diam., glabrous, opening into 4 valves. Flowering June–August, fruiting August.

REMARKS

Spiradiclis coccinea is morphologically similar to *S. purpureocaerulea* by the congested-cymose inflorescences, short peduncles, slenderly

salverform corollas and subglobose capsules, but differs from the latter mainly by having erect stems (vs ascending), most plant parts glabrous or subglabrous (vs densely pubescent), leaf blades narrowly elliptic-oblong or elliptic-oblong (vs ovate to ovate-elliptic) and calyx lobes 1.7–3 mm long (vs 3.5–4.5 mm long) (Lo 1986).

Currently, there are five species of *Spiradiclis* distributed in northern Vietnam (Lo 1999; Hô 2000; Lee *et al.* 2019). Among them, *Spiradiclis coccinea*, *S. leptobotrya* and *S. purpureocaerulea* are restricted to limestone karst areas and usually occur at elevations of 300–600 m, while *S. caespitosa* and *S. hainanensis* grow on slightly acidic soil at elevations of 2500–2900 m and 0–1200 m, respectively. Additionally, the flowering time of the genus in Vietnam is concentrated in May (*S. hainanensis*), July (*S. coccinea*), September (*S. caespitosa* and *S. purpureocaerulea*) and December (*S. leptobotrya*). A key to the five species of *Spiradiclis* in Vietnam is provided below.

KEY TO THE SPECIES OF *SPIRADICLIS* BLUME IN VIETNAM

1. Leaf blades cordate; plant creeping *S. hainanensis* H. S. Lo
— Leaf blades not cordate; plant ascending or erect 2
2. Peduncles longer than 2 cm; corolla tube shorter than 1 cm 3
— Peduncles shorter than 1 cm; corolla tube longer than 1.6 cm 4
3. Leaf blades 1–6.5 cm long; secondary veins 3–7 on each side of the midrib; capsules narrowly oblong or linear-oblong *S. caespitosa* Blume
— Leaf blades 5–10 cm long; secondary veins 8–15 on each side of the midrib; capsules subglobose
..... *S. leptobotrya* Pit.
4. Plants usually erect, glabrous or subglabrous; leaf blades narrowly elliptic-oblong or elliptic-oblong; calyx lobes 1.7–3 mm long *S. coccinea* H. S. Lo
4. Plants usually ascending, densely pubescent; leaf blades ovate to ovate-elliptic; calyx lobes 3.5–4.5 mm long
..... *S. purpureocaerulea* H. S. Lo

Acknowledgements

The authors thank Dr N. S. Khang for his kind help to locate the specimen kept at HN. Our thanks also go to Mrs C. M. He for her help with the layout of figures. This research was supported by the National Natural Foundation of China (grant. no. 31870180) and the Scientific Research Project of Education Department of Hunan Province (grant. no. 18B178).

REFERENCES

- CHEN T. & TAYLOR C. M. 2011. — *Spiradiclis*, in WU Z. Y., HONG D. Y. & RAVEN P. H. (eds), *Flora of China*. Vol. 19. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis: 330–339.
- DENG S. J. 2014. — *A Monograph of Spiradiclis Blume (Rubiaceae)*. Master thesis. South China Botanical Garden, Chinese Academy of Sciences (unpublished).
- HÔ P. H. 2000. — *An Illustrated Flora of Vietnam*. Vol. 3. Trê Publishing House, Ho Chi Minh City, 1020 p.
- LEE J. K., KHANG N. S., CHOUDHARY R. K. & QUANG B. H. 2019. — Two new records of *Spiradiclis* (Rubiaceae) from Vietnam. *Korean Journal of Agricultural Science* 46 (3): 645–651. <https://doi.org/10.7744/kjoas.20190051>
- LO H. S. 1986. — Materials for Chinese Rubiaceae (I). *Bulletin of Botanical Research, Harbin* 6 (4): 31–53.
- LO H. S. 1999. — *Spiradiclis* Blume, in LO H. S. (ed.), *Flora Reipublicae Popularis Sinicae*. Vol. 71 (1). Science Press, Beijing: 86–110.
- LO H. S., SHA W. L. & CHEN X. X. 1983. — A revision of the genus *Spiradiclis* Bl. *Acta Botanica Austro Sinica* 1: 27–36.
- PITARD J. 1923. — *Spiradiclis*, in LECOMTE H. & GAGNEPAIN F. (eds), *Flore générale de l'Indo-Chine*. Vol. 3. Masson, Paris: 84–86. <https://doi.org/10.5962/bhl.title.44886>
- POWO 2019. — *Plants of the World Online*. The Royal Botanic Gardens, Kew. Accessed in <http://plantsoftheworldonline.org/> on 21 October 2019.
- WEN Z. J., YANG J. C., XU Y. F. & WU L. 2019. — *Spiradiclis densa* sp. nov. (Rubiaceae) from limestone areas in Guangxi, China. *Nordic Journal of Botany* 37: e02190. <https://doi.org/10.1111/njb.02190>
- WANG R. J. 2002. — Two New Species of *Spiradiclis* (Rubiaceae) from China. *Novon* 12: 420–423. <https://doi.org/10.2307/3393092>
- WANG R. J., WEN H. Z., DENG S. J. & ZHOU L. X. 2015. — *Spiradiclis danxiashanensis* (Rubiaceae), a new species from South China. *Phytotaxa* 206: 30–36. <https://doi.org/10.11646/phytotaxa.206.1.5>
- WU L., WANG B. M., PAN B. & YU X. L. 2019. — *Spiradiclis tubiflora* (Rubiaceae), a new cave-dwelling species from southern China. *PhytoKeys* 130: 217–224. <https://doi.org/10.3897/phytokeys.130.34625>

Submitted on 7 February 2020;
accepted on 15 June 2020;
published on 14 December 2020.