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A REVISION OF THE SECTION CHRYSANTHA OF CAMELLIA

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Abstract

A revision on the taxonomy of golden Camellia section, *Chrysantha*, was completed. According to the characteristic and variability of the section, there are seven species and five varieties were reduced as synonym, and other two varieties were raised up as new combinated species.

Keywords revision, Camellia, Chrysantha, C. grandis, C. fascicularis

When the Section *Chrysantha* found by the author in 1979, seven species of *Chrysantha* were reported. Two years later, in the monograph of "A Taxonomy of the Genus Camella", nine species were published. For the highly valuation on horticulture and ornament, many botanists and horticulturists were attracted and devoted much attention to surrey and investigation, within Ten years, there are more than 20 new names of yellow Camellia were published. On the high tide of golden camellia investigation, many aspects including cytology karyology, embryology, palynology, anatomy and ultramicroscopic structure are done on the laboratories. As well as hybridization and tissue culture are followed on, and a lot of results were obtained from the chrysanthological activity. The seed-pool and genebase are found by the institutions within the mainland of China, and a new enterprise of golden camellia breeding all over the botanical gardens. Among these works some confusion and ambiguity are inevitably happened, since the ecotypes and some variable characters were identified as an independent species,and a revision on taxonomy were demanded.

The classification of the section *Chrysantha* depends on the corelation between the vegetative and reproductive organs. The texture and the thickness of the leaves are corelated with the lateral nerves.On the thick

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leaves the nerves are usually impressed, as seen from *C. impressinervis* Chang, *C. euphlebis* Merr. and *C. chrysantha*(Hu) Tuyama etc., and in the chartaceous or thinly coriaceous leaves, the nerves are not impressed,as seen from *C. tunghinnensis* Chang, *C. flavida* Chang,*C. pubipetala* wan et Huang, *C. grandis* Chang et S. Y. Liang and *C. Pingguoensis* Fang.

The leaf size and shape are variable in different sites and habitat,they differ in length, dimension, texture and shape, and the shape of the leaf-base is variable also, as seen in *C. chrysantha*(Hu) Tuyama and *C. euphlebia* Marr., their leaves usually shorter than 15 cm, but the extremely exception would longer than 20 cm. The seedling of *C. grandis* Chang et S.Y. Liang commonly bearing oblong leaves, when it moves from Longgang to Guangzhou, the leaves become thickly elliptical, very similar to those of *C. euphlebia* Merr. The type specimen of *C. euphlebia* Merr. has elliptical leaves generally 8-9 cm wide,but some of the leaves seen from the cotype are oblong and 4-5 cm wide. The leaf-base of *C.grandis* Chang et S. Y. Liang is cuneate, and some of the specimens the leaf-base is rounded.

The number of the lateral nerves usually less than 10-pairs, but on the leaves of *C.impressinervis* Chang the lateral nerves more than 10-pairs. In the coriaceous leaves the lateral nerves are heavily sunken, and in the thin blades not so.

The indumentum of the vegetative organ usually corelated with the reproductive organ. When the leaves covered with indumentum,and the branchlets also hairy, as seen from *C. flava* Sealy, *C. impressinervis* Chang and *C.pubipetala* wan et Huang; and such a corelation could be found on the hairy ovary species, when the ovaries covered with indumentum, the branchlets and leaves are usually hairy,as seen on *C. flava* Sealy and *C. pubipetala* Wan et Huang.

The morphological characters of the flowers are somewhat stable. The number and shapes of the bracts and sepals are usually consistent,commonly 5～6 and persistent after blossom. The petals are variable, generally 7～10 in number, in certain species such as *C. chrysantha*(Hu) Tuyama, some time bearing 13-14 petals,since this variability usually happened on the same tree,it seems no specific significance. Stamens are numerous and usually free, sometimes it would slightly united at the base. On *C. fasciculatis* Chang, the stamens united into bundles is an exceptional character. The styles usually free, occasionally, it would slightly united at the base, but such variance would be the same as the stamens

possesses no classification importance.

The ovaries commonly c-mposed of 3-5) celled,they are mostly glabrous, a small group of species, such as *C. flava* Sealy, *C. pubipetala*, *C. longzhouensis* Luo and *C. micrantha* Liang et Zhong, the ovaries are hairy. In the red-flowered Section *Camellia*,there is a corelation between the ovaries and the pericarps, when the ovaries are pubescent, the pericarps are soft and corky,and those glabrous ones the pericarps are woody and harden. But in the Section *Chrysantha*, no corelation were existed between the ovaries and pericarps. Generally, in this section the pericarps usually thin, about 2-4 mm thick, and the thicken pericarp of *C.fascicularis* Chang up to 8 mm thick, is an exceptional exemple.

Most of the testa of the seeds are glabrous, and the hairy testa found on *C. fascicularis* Chang and *C. grandis* Chang et S. Y. Liang would be classificational signification. Such a condition can be found in the red-flowered section *Camellia*,as seen from *C. trichosperma* Chang, etc.

As the characters cited above, in the section *Chrysantha*, it shows not much morphological divergence. The prominent characters which dependable for the classification are as follows:

1. The presence or wanting of the indumentum on the young shoots, leaves and the ovaries.

2. The number of the lateral nerves, togather with the corelation between the thickness of the leaves and the appearance of the lateral nerves whether they are impressed or not.

3. The locular number of the ovaries, whether 5-or 3-celled, and the indumentum presence or wanting,is one of the classificational importance.

4. thickness of the pericarps is important for the classification, although most of them are thin.

5. The indumentum of the testa of the seeds is important for classification.

As to the size of the leaves, the number of the petals and the length of the petioles and pedicles are usually variable, they are less important in classification; as well as the stamens and styles, sometimes they may slightly united at the base, but seems not specific character and would be negligible. If too much overemphasize the subordinate characters, it would induce confusion and ambiguity for the classification.

Most of the golden Camellias are shade plants, commonly distributed on the limestone region and restricted to the smaller area. Some of them were found on the acidic soil, such as *C.euphlebia* Merr., *C.chrysanthoides* Chang

and *C. micrantha* Liang et Huang. And sone others are located both on the basic and acidic soils, as *C. chrysantha*(Hu) Tuyama and *C. tunghinensis* Chang. It seems impossible to depend the habitats as a standard to classified different species.

From the viewpoint of arealology, within the area less than 50,000 km² situated at the border of South Guangxi and North Vietnam there existed 14 species of golden camellia is a terrible exception on the phytogeography This is perhaps due to the plasticity and variation of the section *Chrysantha*. As the well known variable characters on the leaves and some of the flowers, if unconsciously accorded certain variable character to give out new names or species, it would inevitably to induce confusion for the classification, and the revision given here is attempting to clarified the ambiguity.

1. *Camellia limonia* Liang et Mo—**C. tunghinensis** Chang
2. *Camellia limonia* var. *oboveta* Mo et Zhong—**C. flavida** Chang
3. *Camellia longgangensis* Liang et Mo = **C. flavida** Chang
4. *Camellia longgangensis* var. *grandis* Liang et Mo—**C. grandis** Chang et S. Y. Liang, *stat. nov.*
5. *Camellia longgangensis* var. *patens* Mo et Zhong— **C. flavida** Chang
6. *Camellia Chrysantha* var. *longistyla* Mo et Huang—**C. chrysantha** Tuyama
7. *Camellia ptilosperma* S. Y. Liang = **C. Grandis** (Liang et Mo) Chang et S.Y. Liang
8. *Camellia quinqueloculosa* Mo et Zhong—**C. aurea** Chang
9. *Camellia terminalis* J. Y. Liang et Z.M. Su—**C. pinggnoensis** Fang
10. *Camellia parvipetala* J. Y. Liang et Z. M. Liang—**C. grandis** Chang et S. Y. Liang
11. *Camellia chrysantha* yar. *macrocarpa* Mo et Huang—**C. euphlebia** Merr.
12. *Camellia microcarpa* Mo—**C. chrysantha** var. **microcarpa** Mo et Huang
13. *Camellia euphlebia* var. *yunnanensis* Wang et Fan—**C. fascicularis** Chang, *stat. et nom. nov.*

Key to Species of Section Chrysantha

1. Ovarees 5-celled, styles 5 parts, leaves longer than 15 cm
   ……I. Ser. **Flavae**
   2. Ovaries and lower surface of leaves pubescent, leaf-basecouneate
      …… 1. *C. flava* (Pitard) Sealy
   2. Ovaries and lower surface of leaves glabrous, leaf-base cuneate
      …… 2. *C. aurea* Chang

1. Overies 3-celled, styles 3 yarts, leave usually shorter than 15 cm
…… I. Ser. **Chrysantha**

3. Ovaries glabrous.

4. Leaves longer than 12 cm, lateral nerves more than 10pairs,flowe-s 3. 5-5 cm in diameter.

5. Leaves elliptical, filament base more or less united.

6. Filament base united into short tube, capsules thinly pericarp, 2-3 mm thick, seeds glabrous……3. *C.euphlebia* Merr.

6. Filament base united into bundles, capsules with 7-8 mm thick pericarp, seedss pubescent…… 4. *C. fascicularis* Chang

5. Leaves oblong, filaments usually free.

7. Leaves thickly coriaceous, lateral nerves conspicuuosly impressed

8. Branchlets and leaf-back glahairy
…… 5. *C. impressinervi*3 Chang

8. Branchlets and leaf-back brous
……6. *C. chrysantha*(Hu) Tuyama

7. Leaves menbranaceous or thinly coriaceous, lateral nerves not impressed

9. Leaves membranaceous bases obtuse or subrounded, lateral nerves 6-8-pai- rs smooth, flowers 3～4 cm in diam. seedshairy ……
7. *C. grand is* Chang et Liang

9. Leaves thinly coriaceous, bases narrow cuneate, latea'l nerves 9-11-pairs, slightly sunken, flowers 4～5.5 cm in diam. seeds glabrous
8. *C. chrusanthoides* Chang

4. Leaves shorter than 10 cm, lateral nerves less than 10-pairs, flowers smaler, about 3 cm in diameter.

10. Leaves e'liptical or ovata, shorter than 8 long.

11. Leaves oval. bases rounded or obtuse, flowers 1.5～2 cm in diameter, petals 5～6……9. *C. Pingguoens-s* Fang

11. Leaves elliptical, bases cuneate, flowers 3～3.5 cm in diameter, Petals 8～9…… 10. *C. tunghinensis* Chang

10. Leaves oblong, 7～10 cm long, petals 8～11
……11. *C. flavida* Chang

3. Ovaries hairy.

12. Branchlets and leaf-backs hairy, leaves 20 cm cm long, flowers 4-5.5 cm in diameter……12. *C. pubipetala* Wan et Huang

12. Branchlets and leaf-backs glabrous, leaves shorter than 15 cm long, flowers 3-3.5 cm in diameter,

13. Leaves oblong, thickly coriaceous, petals 2 cm long
……13. *C. longzhouensis* Luo

13. Leaves elliptical, thinly coriaceous, petals about 1 cm long
……14. *C. micranthe* S. Y. Liang et Zhong

Ser. I Flavae Chang

1. **Camellia flava** (Pitard)Sealy in Kew Bull. 1949, 217, Rev. Gen. Camellia, 39, 1958; chang in Acta Sci. Nat. Univ. Sunyatseni, 1979,3,70, Tax. Gen. Camellia 102, 1980.—*Thea flava* Pitard, in Lec. Fl. Indo-Chinc, 1:346, 1910.—*Camellia cordatula* Merr. in Journ. Arn. Arb. 20: 349, 1939.

Vietnam Tonkin, Vo Xa Mt. Leaves oblong-elliptical, 15 cm long, lower surface pubescent, base slightly cordate, ovaries 5-celled pilose.

2. **Camellia aurea** Chang in Acta Sci. Nat. Univ. Sunyatseni, 1979, 71; Tax. Gen. Camellia, 102, 1980.—*Camellia quinqueloculosa* Mo et Zhong in Quihria,5(4): 353, 1985. —*syn. nov.*

Guangxi: Fushui County, limestone hill, shrub 4 m high, *Forest-ecology Division of Guangxi Institute* 84382. Vietnam: Liangshan Province, *Exp. Chinaviet-nam* 1959, type , in limestone Mt. evergreen forest.

Differed from *C. flava* Sealy by the glabrous leaves with cuneate bases, and thgelabrous ovaries. *Guangxi Bot. Inst.* 84382 bearing 11-13 petals and the styles slightly united at the base is a variable ecotype only.

3. **Camellia euphlebia** Merr. ex Sealy in Kew Bull. 1949 216, Rev. Gen. Camellia, 41, 1958; Chang in Acta Sci. Nat Uniy. Sunyatseni, 1979, 3: 73, Tax. Gen. Camellia, 108, 1980.—*C. chrysantha* var. *maacrophylla* Mo et Huang in Acta Phytotax. Sin. 17(2): 88,1979.—*syn. nov.*

Ser. II Chrysantha Chang

Guangxi: Tunghin,, *Y. C. Zhong* 622; **Vietnam**, *W. T. Tseng* 27348, type.

Characterized by the elliptical leaves utmost 20 cm long, the filaments united at the base, and the capsules 4.5 cm wide.

4. **Camellia fascicularis** Chang, stat. et nom. nov.

Camellia euphlebia var *yunnanensis* Wang et Fan in Acta Bot. Yunnan 10(3) 635, 1988.

A *C.euphlebia* Merr. differt staminibus fasciculrtis, capsula majorbus 5-8 cm in diam., Pericarlio crassioribus 7～8 mm crassis, seminibus pilosis.

Yunnan: Hekou, alt. 350 m, in forest, *C. J. Wang, G. S. Fan* et *F. C. Rang* 860237, type. ibid *T.L.Min* et *X.*D. *Li* 225

A distinct species differed from *C. euphlebia* Merr. by the filaments united into bundles, larger capsules with much thicker pericarp and pubescent seeds. The original variety name "yunnanensis" is invalid, a new specific name is needed.

5. **Camellia impressinervis** Chang et S. Y. Liang in Acta Sci. Nat. Univ. Sunyatseni, 1979, 3: 72, Tax. Gen. Camellia 105, 1980.

Guangxi: Longzhou, *S. Y. Liang* 700304, type, ibid. *S. H. Chun*3286, ibid. P. *C.Tan* 57315; ibid. *C. S.Ye* 21.

Characterized by the hairy branchlets ahd leaves, the numerous lateral nerves about 10～14-pairs strongly impressed, and 12 petals.

6. **Camellia chrysantha** (Hu) Tuyama in Journ. Bot. Jap. 50: 299, f. 1; Chang in Acta Sci. Nat. Univ. Sunyatseni, 1579, 3: 71.—*Theopsis chrysantha* Hu in Acta Phytotax. sin. 10: 139, 1965.—*Camellia chrysantha* var. *longistyla* Mo et Zhong in Quihaia. 5: 356, 1985. *syn. nov.*

Guangxi: Nanning, *Medical Institute of Guangxi* 17520, type; ibid. *R. C. Guo* 17628;ibid. Letan, *S. Y. Liang* et *Z. M. Huang* 6403506; Tunghin, *Y. C. Zhong* 621; Nanning, *Y. C. Zhong* 7815, 7816; Tunghin, *H. S. Kiu* 167; Guangzhou, Bot. Gard. Sunyatsen Univ *H. T. Chang* 90001, 90002. **Vietnam**: Mone Son Hun Ig, Forestry Institute, *Qujue* 6173.

The leaves are variable in size and shape, comnonly 8~12 cm lomg, utmost to 17 cm long; the petals united at the base usually by different length, when they united higher tht petal limbs spread vertically, while they united shoater the limbs spread horizontaly, such a figure can be found at the same tree,and sometimes it was easily supposed as differen species.

6a. var. **mrcrocarpa** Mo et Huang in Acta Phytotax. Sin. 17(2): 90, 1979. —*C. microcarpa* Mo in Quihaia, 6(1-2): 62, 1982.—*syn. nov.*

Guangxi: Nanning, *X. C. Huang* 7241,, type. Differed from the type by the smaller leaves, flowers and capsules.

7. **Camellia grandis**(Liang et Mo) Chang et S. Y. Liang. *Comb. nov.* —*Camellia longgangensis* Liang et Mo var. *grandis* Lian, et Mo in Quihaia, 2(2): 6a 1982.—*Camellia ptilosperma* Liang et Chen in Bull. Bot. Research4(4): 185, t, 2, 1984. —*syn. nov.* —*Camellia parvipetala* J. Y. Liang et Z. M. Su in Quihaia, 5(4): 357, 1985. —*syn. nov.*

Descriptio emend:

Folia elliptica vel oblongo-elliptica 8-12 cm longa 4-7 cm lata, basi cuneata vel rarius subrotundata, nervis lateralibus 6-8 jugis, petalis 1-2 cm longis, seminibus brunneo-pubescentibus.

Guangxi: Longgang, Longzhou, on limestone mountain, *Exp. Longgang* 11600 type, 11413. 11109,11697; ibid. *H. T..Chang* 6776, 6778; ibid. *P. Ceng* 17005. *Exp.Longgang* 10515, 10249, had been errorously described as the type and paratype of *C.longgangensis* Liang et Mo, are belonged to *C. flavida* Chang. Since the name *C. longgangensis* is invalid, and its variety *grandis* differed from *C. flavida* chang, it is an independent species, so a new combinative name is needed, *C. grandis* (Liang et Mo) Chang et S. Y. Liang is valid, it represent by *Exp. Longgang* 11600,11413, 11697, 11109. The type specimen of *Camellia ptilosperma* Liang et Chen has the same morphological structure as *C. grandis* Chang et Liang. Although Liang et Chen had emphasized his new plant beared hairy seeds, but when the author investigated the paratype of *C. grandis* Chang et Liang, *Exp. Longgang* 11697, it appeared hairy seeds existed on the immature capsule. Unfortunately, T. F. Liang and S. L. Mo had lost sight for it, and mistook that their new plant *C. longgangensis* is glabrous on the testa of the seed. S. Y. Liang and Chen also carelessness on it. Acturally, *C. ptilosperma* is a synonym of *C. grandis*

Chang et Liang. As to the new name *C. parvipetala* J. Y. Liang et Z. M. Su although has broader leaves, but in the specimens of *C. grandis*, as *Exp. Longgang* 11413, has larger leaves, and *P. Ceng* 17005 from Longgang also beared broader leaves,so reduce *C. parvipetala* Liang et Su to *C. grandis* Chang et S. Y. Liang is reasonable. The specimens *H. T. Chang* 776 and 6778 cited above from Longgang have rounded-base leaves, at first glance, it seems differed from *C. grandis* Chang et Liang, but its seed also covered with brownish hair, and some-specimens of *C. grandis*, as *Exp. Longgang* 11109, has subrounded leaf-base, and *W. Y. Fong* 820116b from the same location also bears rounded leafbase. Conclusively, *C. grandis* Chang et Liang is a variable species, both the leaves ane flowers are polymorphorous.

8. **Camellia chrysanthoides** Chang l. c. 73,1979, l.c. 1050 1980.

Guangxi: Longzhou, Mt. Dachingshan, *C. C. Chang* 11847, type; Longgan, *Exp. Longgang* 11364.

The leaves thinly coriceous, lateral nerves 9～11 pairs conspicuous impressed, flowers 4-4.5 cm in diameter, capsules 4.5 cm wide, pericarp 2 mm thicd.

9. **Canellia pingguoensis** Fang in Acta Bot. Yunnan.2(3): 339, 1980; Chang, Tax Gen. Camellia 106, 1980.—*Camellia terminalis* J. Y. Liang et Z. M. Su in Quihaia, 5(3): 183, 1985.—*syn. nov.*

Guangxi: Pingguo County, *S. P. Liao* 37692, type. Characterized by small and oval leaves, flowers about 2 cm in diameter, petals 5-6. *J. Y. Liang* 100861 collected from Tian-Den County, the neighbour county of the type locality, have a terminal flower,and slightly united stale, is a variable form of the species.

10. **Camellia tunghinensis** Chang in Acta.Sci. Nat. Univ. Sunyatseni 1979, 3: 73; Tax. Gen. Camellia, 206, 1980.—*Camellia limonia* Liang et Mo in Quihaia, 2(2): 63, fig. 11 1982.—*Syn. nov.*

Guangxi: Tunghin, *S. Z. Yen* 77001 ,type; ibid. *S. Y. Liang s. n.* SYS herb. no. 153685;ibid. *V. C. Zhong* 80115; Longzhou, Longgang, *Exp. Longgang* 11258 (type of *C. limonia* Lsang et Mo), 11527, 11489, 11549.

Characterized by the smaller elliptical leaves, flowers 3 cm in diameter, capsules smaller compressed tricocous 2.5 cm in diameter. Distributed over the limestone mountain and acidic soil.

11. **Camellia flavida** Chang, Tax. Gen. Camellia, 103, 1980; Chang et Bartholomew, camellias, 129, 1984. —*Camellia longgangensis* Liang et Mo in Quihaia 5(4): 354, 1909—*syn. nov.*—*Camellia limonia* var. *obovata* Mo et Zhong, l. c. 355, 1985. —*syn. nov.*

Guangxi: Longzhou, *S. H. Chun* 13736, *type*; *ibid. C.X. Zhang* et *S. L.* Wang 4095; Longgang, *B. S. Wang* 7902, 7904, 7906, 7911, 7912, 7913, 7914; ibid. *Exp. Longgang* 10249, 10515 (type of *C. longgangensis* Liang et Mo),11481, 11549; ibid. *C. C. Huang s. n.* SYS *herb. no.* 149110, 149111, 149112.

Characterized by the smaller and thinly oblong leaves, generally 6～9 cm long, 2.5～3.5 cm wide, flowers 2.5～3 cm in diametor.

12. **Camellia pubipetala** Wan et Huang in Acta Phytotax. Sin. 20 (3): 316, 1982.

Guangxi: Lung-an County, *Y. Wan* 30042, type, 80094 on limestone mountain. Branchlets, leaves, petals and ovaries are pubescent, styles united at the lower half parts.

13. **Camellia longzhouensis** Luo in Quihaia, 3(3): 192, 1983.

Guangxi: Longzhou, **Y. P. Tan** 76228, type, on the limestone hill; Longgang, **Exp Longgang** 20642.

Differed from *C. pubipetala* Wan et Huang by the glabrous branchlets and leaves, the leaves usually 17 cm long.

14. **Camellia micrantha** S. Y. Liang et Y. C. Zhong, sp. nov.

A *C. pubipetala* Wan et Huang differt ramulis et foliis glabris, floribus minoribus; a *C. longzhouensis* Luo foliis ellipticis minoribus, floribus minoribus differt.

Frutex 2～3 m altus, ramulis glabris. Folia coriacea elliptica 4.5～7 cm longa, 2.5～3.5 cm lata, apice acuta, basi subrotundata, utrinque glabra, nervis lateralibus utrinsecus 5-7 supra impressis subtus elevatis, margine serrulata, petiolis 5～7 mm longis. Flores axillares, pedicelis 3～4 mm longis, bracteis 4～5 circ. 1～1.5 mm longis, sepalis 5 obovatis 3～4, 4～6 mm longis glabris, petalis 6～7 basi connatis 7～10 mm longis, staminibus 6～7 mm longis liberis, ovariis 3-locularibus pubescentibus, stylis 3 liberis 6～7mm longis gracilibus, capsula compresse tricocca circ. 3 cm in diametro, seminibus glabris.

Guangxi: Minming county, Benjiao, *Y. C. Zhong* 12019, typus; *S. Y.* Liang 8409430. This is the fourth species with hairy ovaries. the leaves is variable, the smaller ones 5～6 cm long, the larger one up to 10 cm long.

金花茶组植物订正

张宏达*

摘 要

本文订正了山茶属金花茶组的系统分类，合并了7个异名种和5个变种，另把2个变种提为新组合种。文章对金花茶组的特性和变异性作了较全面的探讨，然后提出合并和提升的依据。

关键词 山茶属，金花茶组，订正，弄岗金花茶，簇蕊金花茶

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