

First, The Germplasm Resource of Dendrobium in China 美主生出谷,不以无人而不芳,是付适立核,不为穷用而改节

- There are 74 species, 2 variations in genus *Dendrobium*, indigenous to China, It is widely distributed in the provinces at the south of Qinling Moutain, with Yunnan province as the major production origins.
- The species with thin stems and small flowers, such as *D. moniliforme*, *D. officinale*, *D. strongylanthum*, *D. nobile*, *D. loddigesii* and *D. huoshanense* are grown as medical plants; And species with thick stems and large flowers are planted as ornamental flowers.



Second, The production of Dendrobium in China 支至生出谷,不以无人而不若,是付适立核,不为穷用而改节

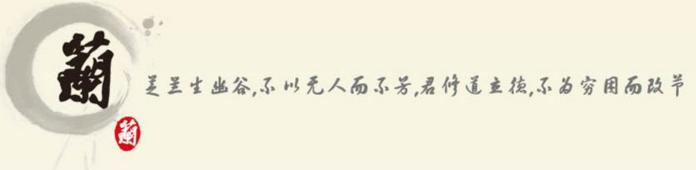
The large-scale production of *Dendrobium* in China started from the early 1990 s. In the early 1990s, Zhejiang province lead in achieving industrialization of Dendrobium officinale, D. officinale industry have been booming in more than ten provinces and areas, it will be the major industry of Traditional Chinese Medicine.



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At present, many provinces, such as Guangdong, Guanxi, Yunnan, Guizhou and Sichuang are main production areas of medical dendrobium. Yunnan, Zhejiang, Fujian, Hainan etc., have many large-scale plantation, the production of cut-flower and potflower can meet the needs of the domestic market.





- Area of plantation planted *Dendrobium* was 80000 acres, in which 30000 acres grow *D. officinale*.
- The major species planted in China were *D. officinale*, *D. densiflorum*, *D. fimbriatum*, *D. nobile*, *D. aphyllum*, *D. devonianum*, *D. chrysotoxum* et al.

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• 1) Den. officinale铁皮石斛

As the name indicates, this is the original medicinal dendrobium species. It is nowadays practically extinct in the wild as it has been over collected. Stem erect, 9-35 cm, 2-4mm in diam. Leaves oblong-lanceolate, to 30-70×9-15 mm. lip white with purple stripes, anther cap white.

The Golden-bow *Dendrobium* or Fried-egg Orchid is a widely cultivated species of orchid.

Stem pseudobulbous, erect, fusiform, 6-30 cm, 1.5-5 cm in diam. At middle, with 2-5 internodes, with many bluntly rounded ridges, golden yellow when dry. Leaves **2-5**, subterminal, oblong, to 19×2 -3.5 cm or wider, leathery, base contracted, not decurrent into clasping sheaths, apex acute and hooked. Inflorescence subterminal ascending or slightly pendulous, to 20 cm, laxly many flowered; peduncle and rachis stout, basal sheaths 4 or 5; floral bracts ovate-lanceolate, 2-3 mm, membranous, apex acute. Pedicel and ovary to 5 cm. Flowers slightly fragrant, thickly textured, golden yellow, lip deeper golden yellow with red stripes on each side at base, anther cap pale yellow. Dorsal sepal oblong, 12-20 mm, 5-9 mm wide at middle, 7-veined, slightly obtuse; lateral sepals nearly equal to dorsal sepal; mentum subglobose, ca. 4 mm wide. Petals oblanceolate, ca. as long as dorsal sepal, ca. $2 \times$ as wide as sepals, ca. 10-veined, margin minutely dentate, apex rounded; lip nearly reniform-orbicular, ca. 20×23 mm, adaxially densely pubescent, margin undulate, apex shallowly bilobed; disk often V-shaped, raised, sometimes with Ushaped chestnut spots. Column ca. 5 mm; anther cap tower-shaped.



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• 3)Den. Nobile 金钗石斛

Stems erect, cylindric, 10-60 cm, stout, to 1.3 cm in diam., fleshy, base conspicuously contracted, unbranched, with many, sometimes slightly swollen, nodes, internodes 2-4 cm, golden yellow when dry. Leaves oblong, $6-11 \times 1-3$ cm, leathery, base with clasping sheath, apex obtuse and unequally bilobed. Inflorescences arising from old stems before or after leaves have fallen, 2-4 cm, 1-4-flowered; peduncle 5-15 mm; basal sheaths several, tubular; floral bracts ovate-lanceolate, 6-13 mm, membranous, apex acuminate. Pedicel and ovary pale purple, 0.3-0.6 cm. Flowers large, all parts white, tinged with pale purple at apex, sometimes entirely pale purplish red, with purplish red striation on either side at base of lip, or lip disk with a central purplish red spot, sometimes white, column green, anther cap purplish red. Dorsal sepal oblong, $25-35 \times 10-14$ mm, 5-veined, apex obtuse; lateral sepals similar, 5-veined, base oblique, apex acute; mentum conic, ca. 6 mm. Petals \pm obliquely broadly ovate, 25-35 \times 18-25 cm, main veins 3, secondary veins many, base shortly clawed, margin entire, apex obtuse; lip broadly ovate, $25-35 \times 22-32$ mm, both surfaces densely pubescent, base shortly clawed, embracing column below middle, margin shortly ciliate, apex obtuse. Column ca. 5 mm, base slightly dilated; anther cap conic, densely finely papillate, front margin with irregular sharp teeth.



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- 4) Den. antennatum 羚羊石斛
- Den. antennatum have twisted petals and a nice perfume scent.
- Stems clustered, clavate, 2m, leave leathery, ovate, 8 × 2 cm.
 Inflorescences 3-15-flowered;
 Flowers large, all parts whitish green, erect and twisted. Sepals white, broad, lip kelly with fuchsia stropes.



ランション きませ出谷、ふりえ人而ふみ、君付重立後、ふる穷田而改节 5) Den. Densiflorum 密花石斛

Stems strongly clavate, swollen, 25-40 cm, to 2 cm in diam., internodes clavate, expanding to a swollen node, obscurely 4-angled, sometimes ridges inconspicuous, yellow, pale brown and glossy when dry, sheathless. Leaves 3 or 4, subterminal, **oblong-lanceolate**, 8-17 \times 2.6-6 cm, leathery, base not decurrent into clasping sheath, apex acute. Inflorescence subterminal, pendulous, densely many **flowered**; peduncle with 2-4 sheaths at base; rachis 6-16 cm; floral bracts broadly oblong or obovate, $12-15 \times 6-10$ (or more) mm, membranous, strongly ca. 10veined, revolute, obtuse. Pedicel and ovary whitish green, 2-2.5 cm. Flowers spreading, 3-4 cm in diam.; sepals and petals pale yellow, lip golden yellow, column and anther cap orange-yellow. Dorsal sepal ovate, $17-21 \times 8-12$ (or more) mm, 5-veined, obtuse; lateral sepals nearly as large as dorsal sepal, ovatelanceolate, 5- or 6-veined, apex subacute; mentum subglobose, ca. 5 mm wide. Petals suborbicular, $15-20 \times 11-15$ mm, with 3 main veins and many secondary veins, base contracted into a short claw, margin erose above middle; lip orbicularrhombic, $17-22 \times \text{up}$ to 22 mm, both surfaces densely lanate above middle, shortly clawed, both sides embracing column below middle, apex rounded. Column ca. 4 mm; anther cap compressed subglobose or conic, front margin truncate, finely notched.



• 6)Den. Terminale 刀叶石斛

Stems erect, sometimes upper part branched, compressed trilateral, 10-23 cm, with leaf sheaths ca. 5 mm in diam., base contracted, with many nodes, internodes ca. 1 cm. Leaves distichous, sparsely overlapping, ascending, laterally compressed and daggershaped, $3-4 \times 0.6$ -1(or more) cm, thickly leathery or fleshy, apex acute. Inflorescence subterminal; peduncle very short; basal sheaths several, membranous; floral bracts small. Pedicel and ovary ca. 7 mm, slender. Flowers small, pale yellowish white. Dorsal sepal ovate-oblong, $3-4 \times ca$. 1.4 mm, 3-veined, subacute; lateral sepals obliquely ovate-triangular, ca. 4 mm, 3- or 4-veined, base very oblique, margin close to column, apex acute; mentum narrowly long, ca. 7 mm. Petals oblong, ca. 10×15 mm, 1-veined, apex subobtuse; lip adnate to apex of column foot, subspatulate, ca. 10×7 mm, adaxially with thickened callus or crestlike protrusion near apex, front margin undulate, apex 2-lobed. Column ca. 1 mm; anther cap truncate and denticulate at apical margin.



Introduce of some species 是至生出谷,不以无人而不芳,是何道立徳,不为穷用而改节

• 7) Den. longicornu 长距石斛

Stems clustered, pendulous, cylindric, 7-35 cm, 2-4 mm in diam., slightly rigid, unbranched, with many nodes, internodes 2-4 cm. Leaves several, narrowly lanceolate, $3-7 \times 0.5-1.4$ (or more) cm, leathery, both surfaces and leaf sheaths with blackish brown rigid hairs, base decurrent forming clasping sheaths, apex acuminate, unequally laterally bilobed. Inflorescence subterminal, 1-3flowered; peduncle ca. 5 mm; basal sheaths 3 or 4, 2-5 mm; floral bracts ovate-lanceolate, 5-8 mm, abaxially dark brown hairy, apex acute. Pedicel and ovary nearly cylindric, 2.5-3.5 cm. Flowers pendulous, pointing downward, cylindric, white, lip with central part of disk orange. Dorsal sepal ovate, $15-20 \times ca$. 7 mm, 7-veined, midvein slightly keeled abaxially, apex acute; lateral sepals obliquely ovate-triangular, ca. as long as dorsal sepal near column side, ca. 9 mm wide at middle, 7-veined, midvein slightly keeled abaxially, apex acute; mentum long and narrow, straight, forming spur, slightly shorter than pedicel and ovary. Petals oblong or lanceolate, 15- $20 \times 4(-7)$ mm, 5-veined, margin irregularly denticulate, apex acute; lip subobovate or rhombic, apex nearly 3-lobed; lateral lobes subobovate, overarching column, 2 lateral lobes farther apart than width of mid-lobe; mid-lobe shallowly bilobed, margin undulate and irregularly toothed, sometimes fimbriate; disk sparsely fimbriate-lacerate along veins, central part with 3 or 4 longitudinal keeled ridges. Column ca. 5 mm, teeth triangular; anther cap nearly flatly conic, front margin densely barbate, apex subtruncate.

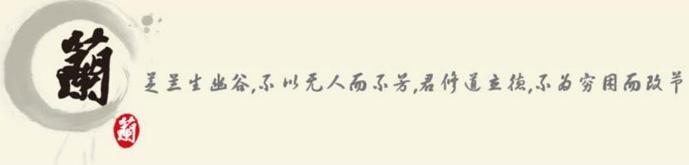




1. References

• The references include guidelines for the conduct of tests for distinctness, uniformity and stability *Dendrobium* (TG/209/1), guidelines for the conduct of tests for distinctness, uniformity and stability *Cymbidium* (TG/164/3), test guidelines of *Dendrobium* and *Cymbidium* of Japan, and

22 research essays, 8 books and 803 pictures.



• 2. candidate characteristics

• There are 114 preliminary candidate characteristics, include the 98 characteristics listed in UPOV guidelines, and "plant: width", "plant: attitude", "pseudobulb: colour", "pseudobulb: number of internode", "pseudobulb: branch", "Varieties with more than one internode only: pseudobulb: shape of internode", "leaf: thickness", "leaf: shape of apex", "leaf: texture", "leaf: Wax on the surface", "leaf: edge", "petal: attitude", "petal: shape of apex", "lip: shape of apex", "column: colour of middle part" "column: spot".

• 3. Main results

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• Quantitative characteristic variation

| characteristic | range | characteristic | range |
|------------------------------|------------------|------------------------------|-----------|
| plant: size | 3-200cm | Flower: length in front view | 11-100mm |
| Pseudobulb: length | 8-300cm | Flower: width in front view | 11-120mm |
| Pseudobulb: thickness | 3-20mm | Dorsal sepal: length | 1.4-3.5cm |
| Pseudobulb: number of noc | le 1-20 | Dorsal sepal: width | 1-1.4cm |
| leaf: number | 2-50 | Lateral sepal: length | 6-14mm |
| leaf: length | 3-20 cm | Lateral sepal: width | 5-7mm |
| leaf: width | 1-7 cm | Petal: length | 1.2-3,5cm |
| Inflorescence: number of flo | wers 2-30 | Petal: width | 1.2-3.2cm |
| Peduncle: length | 0.5-80cm | Lip: length | 0.9-4.5cm |
| Peduncle: thickness | 1-6mm | Lip: width | 1-3.5cm |
| Pedicellate-ovary: length | 3-6mm | Column: length | 1-5mm |
| Pedicellate-ovary: thickness | 1-3mm | Flower: length of mentum | 2-20mm V |
| | | | A |

4. The differences between guidelines of China and 麦麦生出谷,不以无人而不芳,是修适立核,不必聚值/6209/1

• Add: "Pseudobulb: colour" and "Leaf: shape of apex"

• **Adjust:** the state of "Flower: general appearance of petals and sepals", "Leaf: shape"



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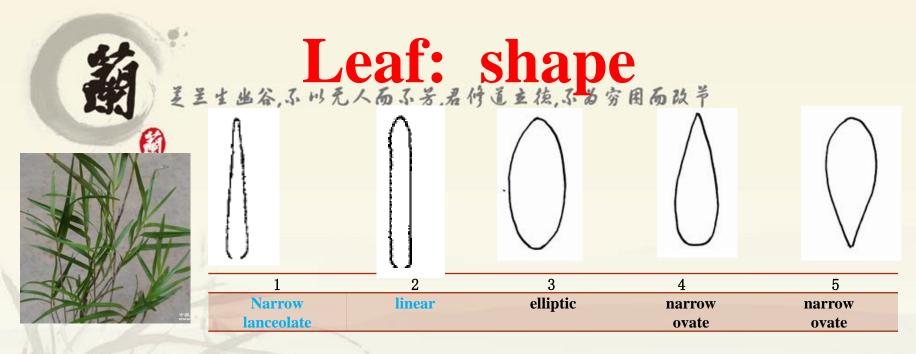
| No | Charecteristic | Method | State | Example Varieties | 代码 |
|-----|-------------------------|--------|--------|--------------------------|----|
| 99 | Pseudobulb: colour PQ | VG | yellow | | 1 |
| | (a) | | kelly | | 2 |
| 1/1 | 26 | | green | | 3 |
| LOX | | | brown | | .4 |
| W/X | V. | | sepia | | 5 |
| 100 | Leaf : shape of apex PQ | VG | acute | | 1 |
| | (b) | | blunt | | 2 |
| | | | sinus | Den. nobile | 3 |

建呈生出谷,不以无人面不号,君修置立族,不为穷困面改节

| 25 | *Flower: general | | all incurving | | 1 |
|----|---------------------------------|---|--------------------------------|-----------------|---|
| | appearance of petals and sepals | | some incurving, some spreading | | 2 |
| | PQ | | all spreading | Den. nobile | 3 |
| | (c) | | some spreading, some reflexing | | 4 |
| | | | some incurving, some reflexing | | 5 |
| | | | all reflexing | Den. officinale | 6 |
| | | - | twist | Den. Antennatum | 7 |

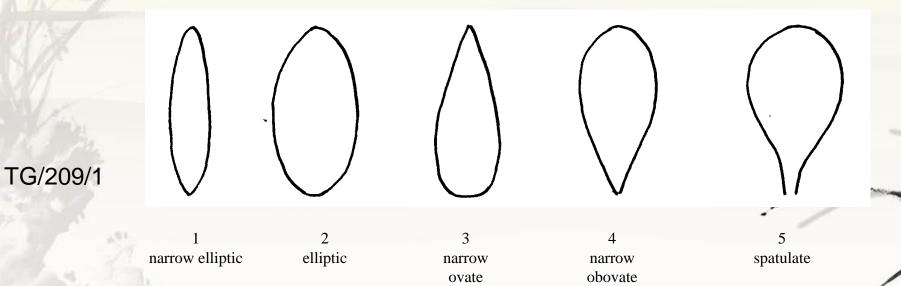








D. hainanensis D. aurantiacum



4. Ask for comments from experts

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 We received 138 advices from 8 experts of different fields, and we accepted 83 advices among them.



Fourth, the structure of guidelines 是是生出谷,不以无人而不芳,是价值立独,不为穷用而改节

- @4.1 Characteristics in guidelines
- Qualitative characteristic: 14
- Pseudo-Qualitative characteristic: 36
- Quantitative characteristic: 44

- 4.2 Grouping characteristics(same as TGP/209/1)
- The following have been agreed as useful grouping characteristics
- (a) Plant: size (characteristic 1)
- (b) Inflorescence: position of flowers (characteristic 18)
- (c) Flower: length in front view (characteristic 27)
- (d) Flower: width in front view (characteristic 28)
- (e) Lip: presence of lateral lobe (characteristic 71)
- (f) Lip: eye (characteristic 77)
- (g) Lip: color pattern (except middle part, eye and throat) (characteristic 8
- (h) Lip: main color (characteristic 82)

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- 4.3 Questionnaire characteristics
- 1*Plant: size(Char.1)
- 2*Inflorescence: position of flowers (Char.18)
- 3*Inflorescence: number of flowers (Char.19)
- 4*Flower: length in front view (Char.27)
- 5*Flower: width in front view (Char.28)
- 6*Lip: presence of lateral lobe (Char.71)
- 7*Lip: eye (Char.77)
- 8*Lip: color pattern (except middle part, eye and throat) (Char.80)
- 9 * Lip: main color (Char.82)
- 10*Time of flowering (Char.98)