

凤凰蜘蛛抱蛋(铃兰科)的补充描述及核型

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摘要: 通过野外和标本室观察,发现凤凰蜘蛛抱蛋的原始描述存在一些错误。重新详细描述了该种的花部形态特征,补充了果实形态特征的描述,并首次报道了其染色体数目($2n=38$)和核型($2n=22m+6sm+10st$)。根据核型特征,认为该种的近缘种应为四川蜘蛛抱蛋和乐山蜘蛛抱蛋,而非黄花蜘蛛抱蛋。

关键词: 凤凰蜘蛛抱蛋; 核型; 铃兰科

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Supplemental description and karyotype of *Aspidistra fenghuangensis* (Convallariaceae)

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Abstract: Based on both field and herbarium observations, some mistakes were found in the original description of *Aspidistra fenghuangensis* K. Y. Lang, a species currently only known from Jishou and Fenghuang, western Hunan Province, China. The flower and fruit characters of this species were re-described in detail. Its chromosome number, $2n=38$, was reported here for the first time. Its karyotype is bimodal and formulated as $2n=22m+6sm+10st$. The karyotypic data indicate that *A. fenghuangensis* K. Y. Lang is more closely related to *A. sichuanensis* K. Y. Lang & Z. Y. Zhu and *A. leshanensis* K. Y. Lang & Z. Y. Zhu than to *A. flaviflora* K. Y. Lang & Z. Y. Zhu.

Key words: *Aspidistra fenghuangensis*; karyotype; Convallariaceae

凤凰蜘蛛抱蛋(*Aspidistra fenghuangensis* K. Y. Lang)是根据采自湖南凤凰县天星山的标本(武陵山考察队 1370, PE)描述的(郎楷永等, 1999)。在原始描述中(protologue)指出的主要特征是:叶片倒披针状长圆形;花被坛状,淡黄色,花被筒长 4 mm,直径 8 mm,裂片卵形,向内弯曲,长 3 mm;柱头膨大,直径 6 mm,上表面隆起。

在开展湘西北主要河谷特殊生境植物区系调查及武陵山区自然保护区标本整理与整合工作中,我

们发现分布于湖南吉首德夯峡谷的一种蜘蛛抱蛋属植物与凤凰蜘蛛抱蛋在形态上极为相似,但花被紫红而非黄色,成熟花的花被裂片反折,柱头边缘 4 深裂几近基部,裂片再二次浅裂成叉状而不同于凤凰蜘蛛抱蛋的原始描述。我们一度怀疑该植物为新种。在查阅了中国科学院植物研究所标本馆(PE)的凤凰蜘蛛抱蛋所有标本后,发现其花被筒形状及柱头形态与德夯蜘蛛抱蛋属植物居群未开放的花相似,因此怀疑凤凰蜘蛛抱蛋的原始文献描述的花可

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能尚未成熟,以至与我们在德夯见到的成熟花不同。为解决这一疑问,2008年10月我们在凤凰蜘蛛抱蛋的模式产地——湖南凤凰县两头羊自然保护区进行了实地考察,在天星山海拔300~500 m的河谷岩壁薄土层上发现了大量的蜘蛛抱蛋属植物居群,采集了各居群具幼嫩花和成熟花的标本,鉴定发现该区所有标本全为一种,即凤凰蜘蛛抱蛋。我们发现该植物的花从花蕾至完全成熟的各个阶段,其花被筒形状和柱头分裂特征的变化与德夯居群完全一致,因此德夯居群应鉴定为凤凰蜘蛛抱蛋。其花被筒外侧幼时稍为黄绿色,成熟后变紫色或白色带紫色斑点,裂片为紫色。我们没有发现原始文献中记载的花被淡黄色的植株,因此这一重要花部特征系不准确的描述。鉴于花被颜色和形状、柱头分裂方式和程度以及果实特征是划分蜘蛛抱蛋属植物种类的重要性状,所以有必要对这些性状进行补充描述。

1 材料和方法

形态学研究:利用野外采集的新鲜材料和标本馆的腊叶标本进行比较观察。细胞学研究:取幼嫩根尖用0.1%秋水仙碱预处理3 h,然后用卡诺液固定2 h,水洗后于60℃恒温水浴中用1 mol/L盐酸:45%醋酸=1:1混合液解离5 min,卡宝品红染色,镜检、观察和拍照。核型分析按照Levan等(1964)的方法进行。核型类型按照Stebbins(1971)的标准划分。凭证标本邓涛081007001保存于吉首大学标本馆(JIU)。

2 结果和讨论

2.1 凤凰蜘蛛抱蛋花、果的补充描述

Aspidistra fenghuangensis K. Y. Lang in *Acta Phytotax. Sin.* 37:494, fig. 13:9-12. 1999. Type: China, Hunan: Fenghuang County, Mt. Tianxing (天星山), alt. 700 m, 1988-09-20, Wulingshan Exped. 1370(PE). 图版 I: A-O.

Descr. amend.: Flores solitarii, erecti, aromatici; perianthium juventate conspicue urceolatum, carnosum, extus primo viride, luteolo-viride, album vel purpureo-punctatum, demum purpurascens, intus purpureum, 6-9 mm longum, 11-13 mm diam., superne 8-lobatum, lobis triangulari-

bus, inflexis, 6 mm longis, basi 3-4 mm latis, apice obtusis, intus prope basin carinis 2 brevibus et latis carnosus mamillatis ornatis; stamina 8, prope medium tubi affixa, stipitata, stipitibus 0.5-0.7 mm longis, antheris longe ellipticis, 2.8 mm longis, 1.2 mm latis; pistillum 6 mm longum, ovario paulo inflato, stigmatate peltato-dilatato rotundato, 7-9 mm diam., prope marginem excavationibus 8 parvis praedito, pagina supera elevata in medio excavatione 1 quadrato margine elevata ornata, circum excavationem costis 3-4 crassis radiato-dispositis instructo, margine 4-lobato, lobis apice emarginatis; Bacca compresso-globosa, purpurea, 1.8 cm diam., extus irregulariter muricata; semina compresso-semiglobosa, laevia. Fl. Sept.-Oct., fr. Oct.

花、果补充描述:花单生,直立,具香味;花被幼时明显坛状,成熟后钟状,肉质,花被外面颜色幼时绿色、黄绿色、白色或带紫色斑点,后变紫色,内面紫色,先端8裂;花被筒长6-9 mm,直径11-13 mm,裂片三角形,长6 mm,基部宽3-4 mm,幼时向内弯曲靠拢,成熟后向外翻略反折,内侧在靠近基部具2条短而宽、肉质、被细乳突的脊状隆起;雄蕊8枚,着生于花被筒的中部偏下,具柄,柄长约0.5-0.7 mm,花药长椭圆形,盾状着生,长约2.8 mm,宽约1.2 mm;雌蕊长约6 mm,柱头紫色,盾状膨大,圆形,直径7-9 mm,上表面隆起,中心处为一凹穴,其边缘隆起,周围具4条粗、呈放射状排列的棱,边缘4深裂几近基部而略呈十字状,裂片先端凹缺成叉状,柱头靠近边缘具8个小凹窝。浆果扁球形,紫红色,直径1.8 cm,外表面具不规则的瘤状或刺状突起。种子扁半球形,光滑。花期9-10月,果期10月。

检查的标本:湖南:凤凰,天星山, alt. 475 m, 河谷岩壁薄土层上, 2007-10-03, 邓涛、张代贵 071003005(JIU);吉首,德夯, alt. 300-700 m, 峡谷林下荫湿处, 2008-10-07, 邓涛 081007001(JIU)。

2.2 凤凰蜘蛛抱蛋核型及其分类学意义

染色体数目为 $2n=38$ (图1:A)。核型公式为 $2n=22m+6sm+10st$ 。具9对大中型染色体和10对小型染色体(图1:B;图2),其中第1、10-19对染色体为中部着丝点染色体;第3、7、9对染色体为近中部着丝点染色体;第2、4、5、6、8对染色体为近端着丝点染色体;染色体相对长度变化范围在2.54



图版 I 凤凰蜘蛛抱蛋 A. 生境; B. 生境特写; C. 全株形态; D. 根茎及花; E. 浆果; F. 花正面; G. 花被纵切示雌蕊形态; H. 花被筒; I. 柱头正面; J. 柱头背面; K. 花被剖切示雄蕊着生位置; L. 花药; M. 不同时期柱头形态(正面); N. 不同时期柱头形态(背面); O. 不同时期花被筒形状。
 Plate I *Aspidistra fenghuangensis* K. Y. Lang A. Habitat; B. Habitat, close-up view; C. Posture; D. Rhizome and flowers; E. Berry; F. Perianth, adaxial view; G. Perianth, longitudinally dissected, showing the shape of pistil; H. Perianth, side view; I. Stigma, adaxial view; J. Stigma, abaxial view; K. Perianth, longitudinally dissected, showing the position of stamens; L. Stamens; M. Stigma(adaxial view), showing the morphological variation in different periods; N. Stigma(abaxial view), showing the morphological variation in different periods; O. Perianth, showing variation in different period.

—12.27 μmm 之间,臂比值大于 2 的染色体的百分比为 37%,最长与最短染色体比值为 4.83(表 1)。核型属于 2C 型。

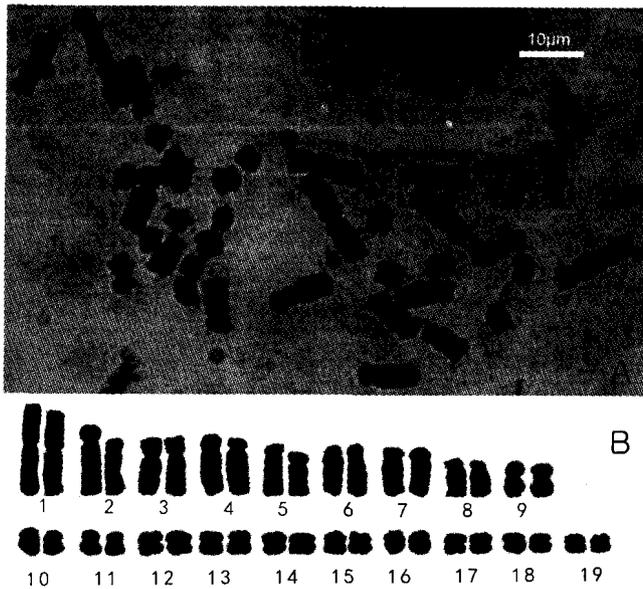


图 1 凤凰蜘蛛抱蛋的染色体数目(A)和核型(B)
Fig. 1 Chromosome number (A) and karyotype (B) of *A. fenghuangensis*

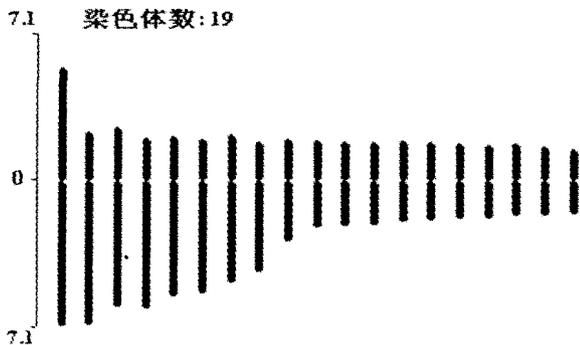


图 2 凤凰蜘蛛抱蛋的核型模式图
Fig. 2 Karyotype ideogram of *A. fenghuangensis*

郎楷永等(1999)指出凤凰蜘蛛抱蛋与乐山蜘蛛抱蛋 *Aspidistra leshanensis* K. Y. Lang & Z. Y. Zhu 和黄花蜘蛛抱蛋 *A. flaviflora* K. Y. Lang & Z. Y. Zhu 近似。从染色体资料来看,乐山蜘蛛抱蛋的核型为 $2n=22m+2sm+14st(2sat)$, 2C 型,与凤凰蜘蛛抱蛋的核型相似,两个种的外部形态也相似,因此它们可能近缘。但凤凰蜘蛛抱蛋与黄花蜘蛛抱蛋在花被颜色和先端裂片数目、柱头形状和分裂方式以及果实形状等方面均有区别,而且黄花蜘蛛抱蛋的核型为 $2n=18m+2sm+18st$, 3C 型(洪德元,

1986),也与凤凰蜘蛛抱蛋的核型区别较大,因此这两个种可能关系较远。

表 1 凤凰蜘蛛抱蛋的染色体参数

Table 1 Parameters of chromosomes of *A. fenghuangensis*

染色体序号 Chromosome No.	相对长度 Relative length	臂比 Arm ratio	类型 Type
1	$7.11+5.16=12.27$	1.38	m
2	$7.05+1.95=9.00$	3.62	st
3	$6.16+2.15=8.11$	2.86	sm
4	$6.25+1.66=7.91$	3.76	st
5	$5.62+1.67=7.29$	3.37	st
6	$5.44+1.53=6.97$	3.55	st
7	$4.96+1.77=6.73$	2.80	sm
8	$4.39+1.39=5.78$	3.17	st
9	$2.88+1.57=4.43$	1.83	sm
10	$2.18+1.49=3.67$	1.46	m
11	$2.13+1.43=3.56$	1.49	m
12	$2.00+1.36=3.36$	1.47	m
13	$1.90+1.44=3.34$	1.31	m
14	$1.77+1.38=3.15$	1.28	m
15	$1.69+1.34=3.03$	1.27	m
16	$1.72+1.27=2.99$	1.36	m
17	$1.56+1.32=2.88$	1.19	m
18	$1.59+1.18=2.77$	1.35	m
19	$1.52+1.02=2.54$	1.48	m

四川蜘蛛抱蛋 *A. sichuanensis* K. Y. Lang & Z. Y. Zhu 的核型为 $2n=22m+4sm+12st(2sat, 2C$ 型(洪德元, 1986), $2n=38=20m+6sm+12st(2SAT, 2C)$ (乔琴等, 2008),与凤凰蜘蛛抱蛋的核型相似。两者花被筒均为紫色,花被裂片内侧均具纵向、被小乳突的脊状隆起,柱头上表面不平坦,具向四周呈放射状排列的棱状隆起,区别仅在于四川蜘蛛抱蛋的柱头裂片先端心形凹缺、不成叉状,因此凤凰蜘蛛抱蛋也应与四川蜘蛛抱蛋近缘。

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