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DIODIA VIRGINIANA L. (RUBIACEAE) IN HSINCHU: NEW TO TAIWAN[1]

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Abstract

Diodia virginiana L. (Rubiaceae) is reported for the first time from Taiwan. It represents a new record for both the species and the genus on this island. Taxonomic description, palynological observations, and ecology of the local population are provided. A key to differentiate *Diodia* from *Borreria*, a close relative known to occur in Taiwan, is also given. Plants from the local population have a gametic chromosome number of $n=14$.

Key words: *Diodia virginiana;* Rubiaceae; taxonomy; ecology; palynology.

A recent collection made by our assistant, Ms. Yun-Chen Lin, has resulted in the finding of the *Diodia virginiana* L., a new record for both the species and the genus of Rubiaceae for the flora of Taiwan.

Diodia (鈕扣草屬) is stemmed from the Greek *diodos*, a thoroughfare, where plants of this genus are frequently found. *Diodia virginiana* is a common weed originally native to North America (Osada, 1976). It was introduced to Japan probably before 1969 (Osada, 1976). The result of local inquisition and the limited range of this American weed indicate that the species probably was introduced to Taiwan quite recently.

Diodia virginiana is easily spotted by its white, 4-lobed flowers and fruits with two prolonged calyx teeth. The plants were in full blossom and fruiting when collected on September 18, 1986 at Chinshanli (24°47′ N, 120°61′E), Hsinchu City (voucher specimens *Hsieh & Chaw 1501*, TAI & HAST). They occur as open colonies of prostrate, much branched herbs in a small patch of grassland between a bamboo (*Bambusa oldhamii* Munro) grove and an abandoned guava garden. The

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grassland is characterized by a thick cover of grasses and other herbs. The most abundant among them are *Paspalum conjugatum* Berg., *Panicum repens* L. and *Cynodon dactylon* (L.) Pers. Other associates include *Commelina communis* L., *Ludwigia octovalvis* (Jacq.) Raven, *Desmodium heterocarpon* (L.) DC., *Polygonum hastatosagittatum* Makino, *Alternanthera sessilis* (L.) R. Brown *ex* Roem. & Schultes, *Ageratum houstonianum* Mill., *Paederia scandens* (Lour.) Merr., *Miscanthus floridulus* (Labill) Warb. *ex* Schum. & Laut., *Kyllinga brevifolia* Rottb.; and some shrubby plants of *Lantana camara* L. and *Urena lobata* L. Seed productivity and fertility of the present species are high, and numerous seeds as well as seedlings were found around mature plants.

Diodia virginiana is closely similar to the species of *Borreria* G.F.W. Meyer known to occur in Taiwan (cf. Hsu, 1973; Chao, 1978) in having white, axillary flowers, and single ovule in each cell of the ovary. However, they are easily distinguished by the following key:

1a. Flowers usually solitary at each leaf axil; calyx lobes 2; corolla tube ca. 15 mm long; ripe fruits with prominent ridges, separating into 2 indehiscent cocci..... *Diodia*

1b. Flowers usually several to many at each leaf axil, or in termianl clusters; calyx lobes 2 or 4; corolla tube less than 10 mm long; ripe fruits without ridges, dehiscent..... *Borreria*

As an aid to other workers, we provide the following description and illustrations of *Diodia virginiana*, basing on live materials from Taiwan. For the palynological study, acetolyzed pollen grains (Erdtman's method, 1952) were examined under both a Hitachi S-250 scanning electron microscope (SEM) and a Zeiss Universal light microscope.

Diodia virginiana L., Sp. Pl. ed. 1. 104. 1753. 大鈕扣草 (新擬中文名) (Fig. 1 & 2)

Prostrate, ascending, branching perennial from a woody root crown. Stem sharply or obtusely 4-angled, the angles with retrorse, fine hairs, the branches up to 60 cm long. Leaves elliptic-lanceolate to oblanceolate, the margins minutely serrulate, the lateral nerves 4-5 on each side of costa; petioles ca. 3 mm long; stipules membranous, adnate to petioles, glabrous. Flowers 1 or sometimes 2-3 per leaf axil; calyx lobes 2, linear-lanceolate, 5-7 mm long, pubescent; corolla white, the limb to 18 mm wide, the tube filiform, to 15 mm long, glabrous on both surfaces, the lobes 4-5 mm long, pubescent adaxially except sparsely so at apex, filaments ca. 2 mm long; style glabrous, to 13 mm long; stigma to 4 mm long. Fruits pubescent, ellipsoid, 6-9 mm long, 4-6 mm in diameter, prominently 8-ridged, crowned with 2 prolonged calyx lobes; seeds 5-6 mm long, 2-3 mm wide, the surface reticulate. Pollen grains tectate, 9-(10-) colpate, circular in polar view, suboblate to oblate-spheroidal in equatorial view, 36-48×45-58 μm (P×E); colpi 6-12 μm long, operculate; exine microechinate and microfoveolate.

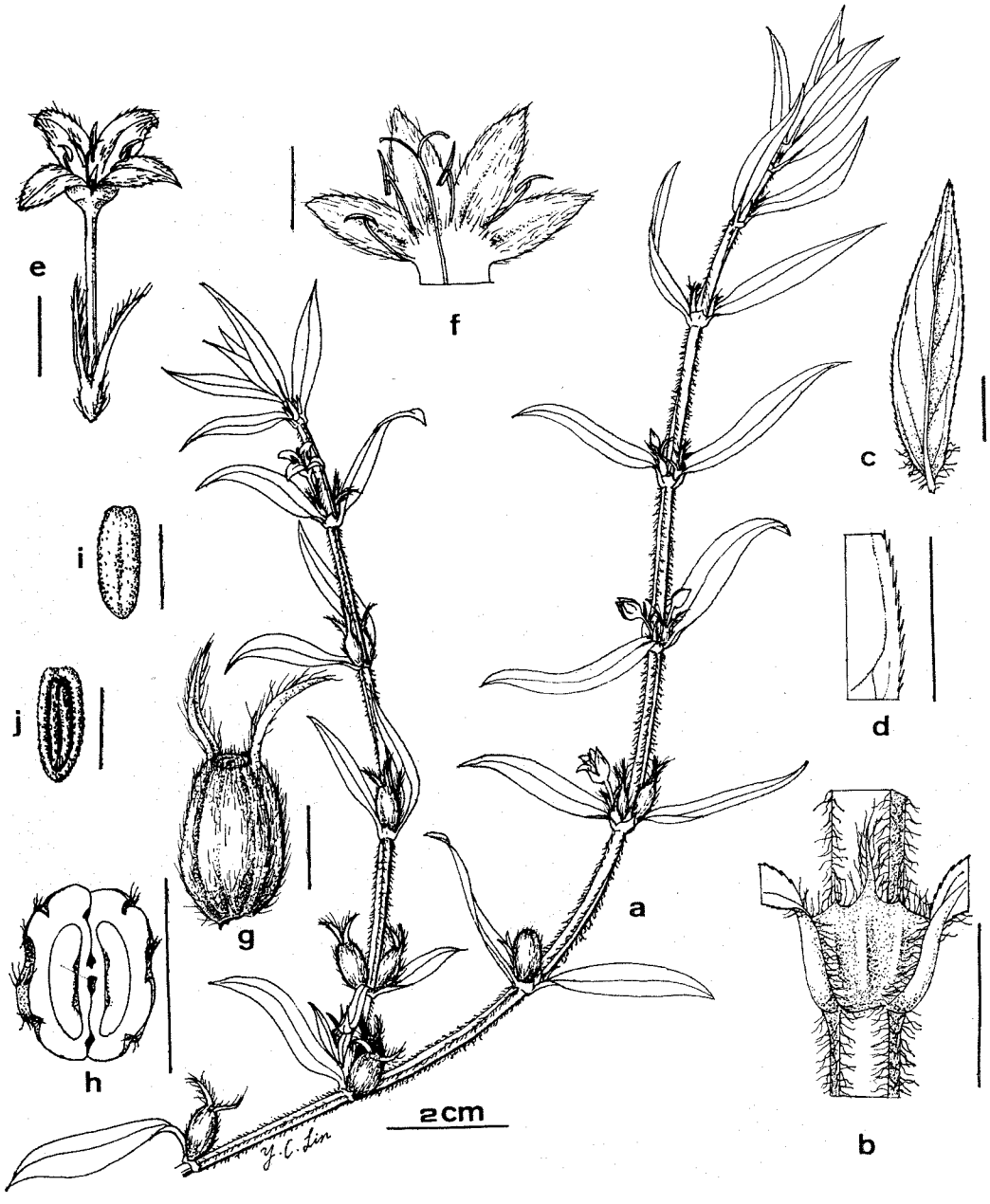

Fig. 1. *Diodia virginiana* L. a. habit; b. node, showing membranous stipule adnate to petioles; c. leaf, abaxial surface; d. portion of leaf margin; e. flower; f. dissected corolla, showing stamens and a portion of style; g. fruit; h. cross section of fruit; i. seed, abaxial surface; j. seed, adaxial surface. All scale bars equal to 5 mm long except as otherwise stated.

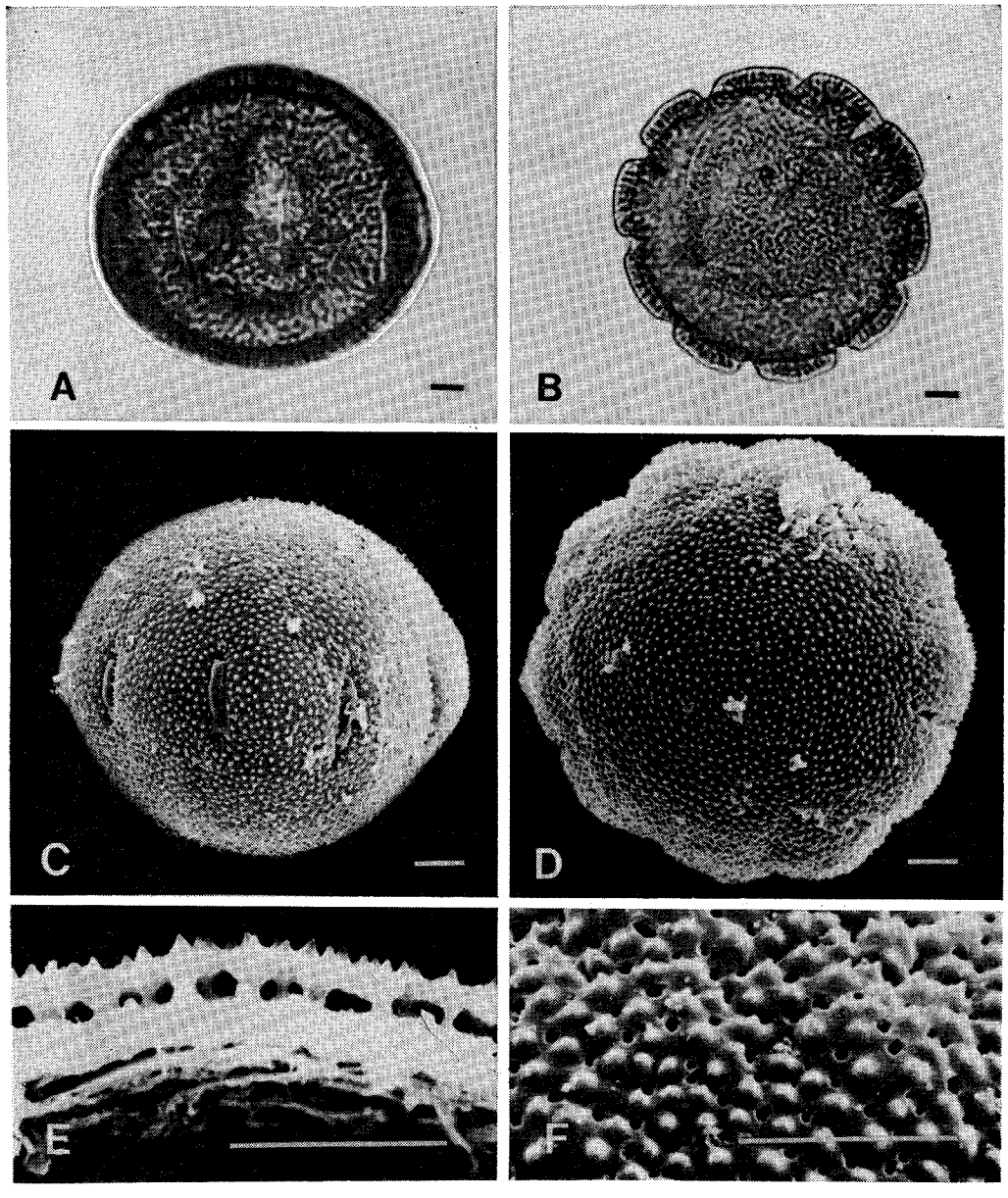

Fig. 2. Pollen grains of *Diodia virginiana*. A-B. light microscope; C-F. SEM. A. equatorial view; B. polar view; C. equatorial view; D. polar view; E. cross section of exine; F. close view of exine surface, showing microechinae and perforations. All scale bars equal to 5 μm.

Notes. Pollen grains of the present species seem closely related to those of its congeneric species, *Diodia rigida* Cham. & Schlecht. as compared to the description made by Erdtman (1952). A gametic chromosome number of $n=14$ is obtained from *Hsieh & Chaw 1501.* This result agrees with Lewis' report (1962) for *D. virginiana.*

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大鈕扣草—臺灣新歸化植物

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大鈕扣草（*Diodia virginiana* L.）爲茜草科（Rubiaceae）的草本匍匐性植物，原分佈於北美洲，在臺灣係發現於新竹市金山里。本文對其生態特徵及生育地環境詳加描述，提供檢索表以資區別臺灣之同科近親—鴨舌癀屬（*Borreria* G.F.W. Meyer）植物。此外，並以光學和電子顯微鏡觀察及描述其花粉形態；且報導其染色體數目（$n=14$）。