COCCINIA GRANDIS (CUCURBITACEAE), A NEWLY NATURALIZED WEED IN TAIWAN

CHIU-MEI WANG[1] and CHIH-SHENG WU[2]

[1]National Museum of Natural Science, Taichung, Taiwan 404, R. O. C.
[2]East Coast National Scenic Area Administration, Tourism Bureau, R. O. C.

ABSTRACT- *Coccinia grandis* (L.) Voigt, a palaeotropical native Cucurbitaceous species, has recently become naturalized in eastern Taiwan. It represents a new record for this genus and species on this island. The present study gives a taxonomic description for the genus and species, a line drawing of *C. grandis*, and a key to the genera within the tribe Sicyoëae in Taiwan.

KEY WORDS: *Coccinia grandis*, Cucurbitaceae, weed, taxonomy, naturalized plant, Taiwan

INTRODUCTION

In the summer of 1994, we found a previously unrecorded Cucurbitaceous species at the dry bed of the Peinan River in eastern Taiwan. Subsequently, this species was collected from the old Taitung railway station and at Sanyuan beach. We have identified it as *Coccinia grandis* (L.) Voigt, which represents a new record for this genus and species in Taiwan. A taxonomic treatment of *Coccinia* and *C. grandis* in Taiwan is given below.

Coccinia Wight & Arn., Prodr. Fl. Penins. Ind. Or. 1: 347. 1834. Hutchinson, Gen. Fl. Pl. 2: 412. 1967.

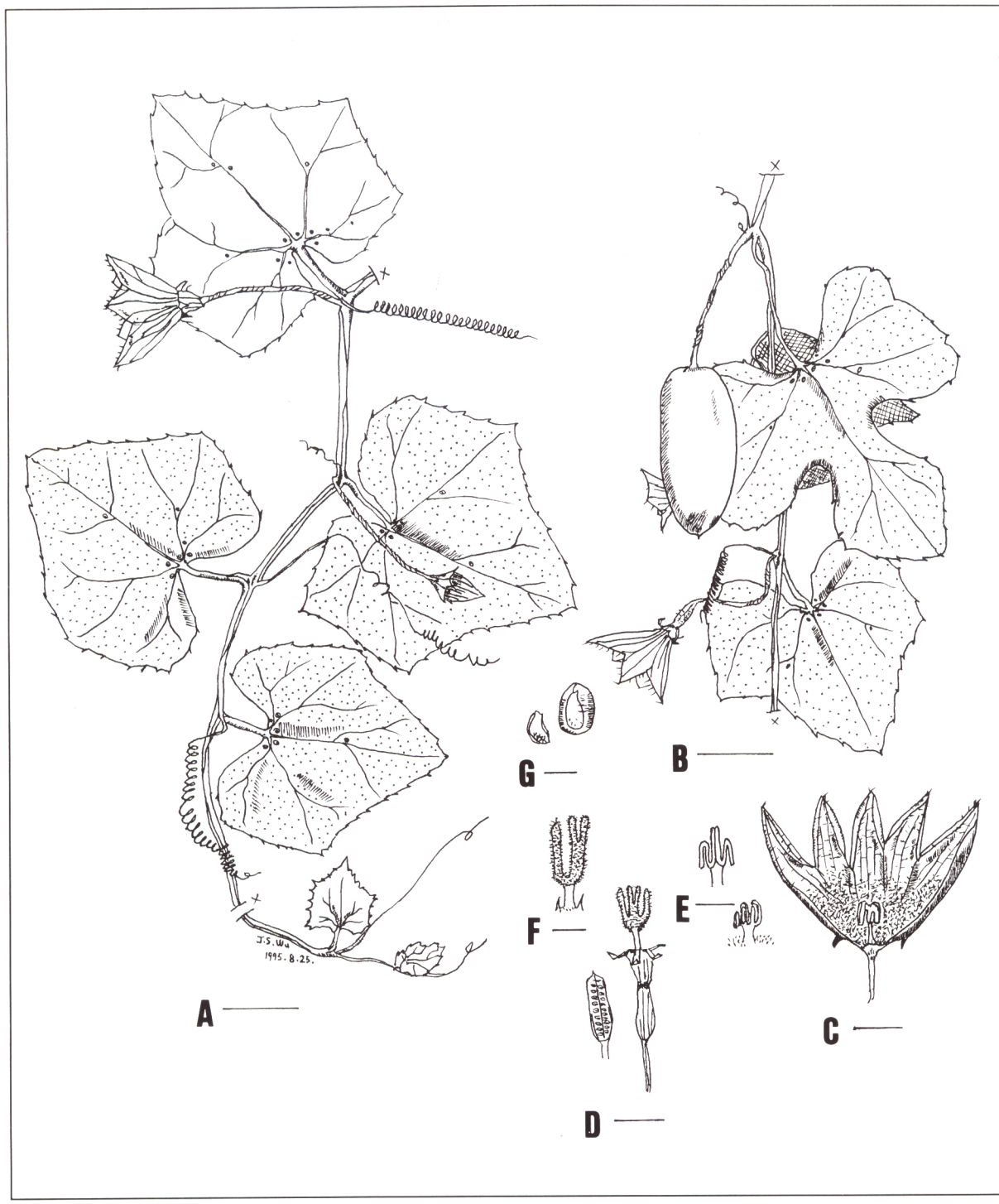
Slender climbing or prostrate herb, glabrous or scaberulous; root often tuberous; leaves deltoid or rounded-cordate, angular or lobed, sometimes glandular below; tendrils slender, simple or 2-forked. Flowers dioecious, rarely monoecious, male solitary or subcymose; calyx short, campanulate or turbinate, teeth 5; corolla campanulate, shortly 5-fid, lobes acute; stamens 3, inserted in tube or at bottom of calyx; filaments connate into a column or rarely free; anthers connate or coherent into a head, loculi conduplicate; rudimentary ovary absent; female flowers solitary; calyx and corolla as in the male; rudiments of stamens short or elongated; ovary ovoid, oblong or linear, with 3 placentas; style elongated, stigmas 3, 2-lobed or 2-partite; ovules numerous, horizontal; fruit a berry, cylindric or oblong, terete; seeds numerous, ovate, compressed, margined, testa smooth or scrobiculate.

This genus includes about 30 species primarily of tropical Africa, tropical Asia.

Coccinia grandis (L.) Voigt, Hort. Suburb. Calc. 59. 1845; Keraudren in Aubr'ev. et J.-F. Leroy, Fl. Camb. Laos & Vie't. 15: 66. 1975; Lu & Zhang, Fl. Reip. Pop. Sinicae 73: 262-264. 1986; Lu & Zhang, Fl. Guangxi 1: 715. 1991; Wu, Fl. Yunnanica 6: 383. 1995; Wu, Fl. Guangdong 3: 140. 1995 (text-figs. 1, 2).

Bryonia grandis L., Mant. 1: 126. 1767; Lour., Fl. Cochinch. 595. 1790.

A perennial vine with tuberous roots. Stems somewhat woody, much-branched, glabrate; tendrils simple. Leaves membranous to chartaceous, broadly ovate, 3-10 cm long, 4-10 cm wide,



Text-figure 1
Coccinia grandis (L.) Voigt A. vine with staminate flower, bar = 2 cm; B. vine with pistillate flower, bar = 2 cm; C. staminate flower, bar = 1 cm; D. style, bar = 1 cm; E. anther, bar = 0.5 cm; F. stigma, bar = 0.4 cm; G. seeds, bar = 0.5 cm.

Text-figure 2
Photographs of *Coccinia grandis* (L.) Voigt A flowers; B. fruit. Bars = 1 cm.

5-angled to palmately 3-5-lobed, glabrate, surface papillate-scabrous, with concave glands basi-laminar or toward veins, margins strigose, serrulate, apex acute, tips mucronulate, bases cordate, petioles 1-3 cm long, glabrous or slightly hairy laterally above. Dioecious. Staminate flowers solitary, rarely 2 or 3 in axillary clusters, pedicels 15-40 mm long; hypanthium campanulate, lobes 5, subulate or linear-lanceolate, recurved, 2-5 mm long; petals white or pale yellow; tomentose inside, ovate, 15-20 mm long; pistillate flowers solitary on stalks 10-30 mm long; hypanthium 10-15 mm long. Fruits red, ovoid to ellipsoid, 25-60 mm long, 15-35 mm in diam., glabrous, pulp red, peduncles 1-4 cm long. Seeds yellowish, verrucose, 6-7 mm long, margins thickened; flowering May-Dec.

Specimens examined. TAIWAN. Taitung Co.: Peinan River mouth, alt. 3 m, 9 December 1994, *C. S. Wu 4-065*(♂)(TNM); alt 5 m, 23 August 1995, *C. S. Wu 7-014* (♂) (TNM); Sanyuan, alt. 5 m, 13 August 1995, *C. S. Wu 7-013* (♀) (TNM); alt. 5 m, 23 August 1995, *C. M. Wang 01623* (♀) (TNM); Taitung City; the old Taitung railway station, 23 August 1995, *C. S. Wu 7-015* (♀) (TNM).

DISTRIBUTION

Coccinia grandis occurs frequently in open fields and low river beds at 0-30 m elev. It is also found around city buildings and gardens, usually climbing on other plants, walls, and garden enclosures. It is either solitary or often associated with such weeds as *Chloris barbata* Sw. and *Barchiaria mutica* (Forsk.) Stapf. We have observed Chinese Bulbul (*Pycnonotus sinen*sis) and Japanese White-eye (*Zosterops japonica*) eat fruits of *C. grandis*, which apparently facilitates dispersal of seeds.

Coccinia grandis is distributed in northern tropical Africa eastwards from Senegal to the Somali Republic; Arabia; tropical Asia from W. Pakistan to Hainan Is.; Malaysia and tropical Australia and Fiji. It has been introduced into the West Indies and tropical South America (David et al., 1990; Hutshinson and Dalziel, 1954; Hutshinson, 1967; Jeffrey, 1967) and has been naturalized in Hawaii (Wagner et al., 1990). In this study, it has been found only in Taitung County of Taiwan.

NOTES

Coccinia belongs to the tribe Sicyoëae (Hutchinson, 1967), which is characterized by having 3 or rarely 2 stamens, filaments more or less connate in a column, anthers separated or coherent, loculi straight or conduplicate; seeds usually numerous, rarely few or solitary, horizontal, pendulous, or ascending. The tribe Sicyoëae is represented by 4 genera, i.e., *Gynostemma*, *Coccinia*, *Sicyos* and *Sechium* in Taiwan. *Gynostemma* is indigenous, *Sechium* is cultivated as a crop, and both *Coccinia* and *Sicyos* are naturalized. The occurrence of *Sicyos angulatus* L. in Taiwan was first reported by Liu (1983). However, it was not treated in the 2nd edition of the Flora of Taiwan, in which it is indicated, because the species was found only once (Liu, 1993). In our field excursions, we have collected this species in an additional locality: at the intersection of the Central Cross-Island Highway and county rd. 122, Taichung Co. (*C. M. Wang 02355*, *02492*, TNM). Genera of Sicyoëae in Taiwan can be distinguished by the following key.

Key to genera of the tribe Sicyoae in Taiwan

1. Ovules and seeds erect, horizontal, ovules numerous ..... *Coccinia*
- Ovules and seeds pendulous, ovules 1-6 2
2. Ovary 3- or 2-locular, each locule with 2 ovules; flowers in lax axillary panicles .... *Gynostemma*
- Ovary 1-locular, with 1 ovule; flowers solitary, in raceme, corymb, or capitate 3
3. Fruits somewhat woody; anthers connate ..... *Sicyos*
- Fruits fleshy; anthers free ..... *Sechium*

ACKNOWLEDGMENTS

We thank Dr. Ching-I Peng for helpful discussions, and Dr. Chen-Hsiung Ou for access to helpful literature.We thank also Dr. Ho-Yih Liu and Dr. Jenn-Che Wang for critically reviewing the manuscript.

REFERENCES

David, M. Bates, Robinson , R. W. and Jeffrey, C., 1990. Biology and Utilization of the Cucurbitaceae: *Coccinia*. Cornell Univ. Press, London.

Jeffrey, C., 1967. Cucurbitaceae. *In*: Milne-Redhead E. and Polhill, R. M. (eds.). Flora of tropical East Africa. pp. 45-47. Crown Agents for Oversea Governments and Administrations; London.

Keay, R. W. J., 1954. Cucurbitaceae. *In*: Hutchinson, J. and Dalziel, J. M. (Eds.). Flora of West Tropical Africa (rev. ed.) Vol. 1. pp. 204-216. Crown Agents for Oversea Governments and Administrations; London.

Hutchinson, J., 1967. The genera of flowering plants. 2nd. ed. Vol. 2. Oxford Univ. Press.

Liu, H. Y., 1983. Notes on Taiwan Cucurbitaceae. Taiwania 28: 117-121.

Liu, H. Y., 1993. Cucurbitaceae. *In*: Flora of Taiwan, 2nd ed., vol. 3. pp.855-871. Editorial Committee of the flora of Taiwan.

Lu, A. M. and Zhang, Z. Y., 1986. *Coccinia*. *In*: Flora Reipublicae Popularis Sinicae, Vol. 73. pp. 84-280. Sci. Press. Beijing. (in Chinese).

Lu, A. M. and Zhang, Z. Y., 1991. *Coccinia*. *In*: Flora of Guangxi , Vol. 1, pp. 715-716. Guangxi Sci. and Tech. Publ. House, Guangxi (in Chinese).

Wagner, L., Herbst, D. R. and Sohmer, S. H., 1990. Manual of the flowering plants of Hawaii Vol. 1. Univ. of Hawaii Press.

Wu, C. Y. (Ed.), 1995. Flora Yunnanica. Sci. Press, Beijing, Vol. 6. pp. 383-385 (in Chinese).

Wu, T. (Ed.), 1995. Flora of Guangdong. Guangdong Sci. Tech. Press. Vol. 3. pp. 139-140 (in Chinese).

Manuscript received February 1, 1997
Revised manuscript accepted May 29, 1997

臺灣新歸化瓜科(葫蘆科)植物--紅瓜

王秋美、吳志昇

摘 要

紅瓜 (*Coccinia grandis* (L.) Voigt) 原產古熱帶的一種瓜科植物，新近發現歸化於臺灣東部。對臺灣而言，此發現是新記錄屬，且是新記錄種。本文除對其分類特徵及生態環境加以描述外，並提供臺灣佛手瓜族植物屬的檢索表。

關鍵詞：紅瓜、瓜科、雜草、分類、歸化植物、臺灣

GUIDE TO AUTHORS

自然科學博物館學報(Bulletin of the National Museum of Natural science) is a professional research journal of the National Museum of Natural Science, Taiwan Republic of China, dedicated to emphasizing the impact of life on earth history. Bulletin of the National Museum of Natural Science is oriented to a broad international spectrum of scientists interested in zoology, botany, geology, and anthropology, Accordingly, manuscripts whose subject matter and conclusions have above mentioned topics will be selected for publication.

Preparation of Manuscripts. An original and two copies must be submitted, together with copies of the illustrations for mailing to referees. Original copy must be prepared on typewriter or word processor, double-spaces, on one side of standard white bond paper, with 2cm margins, submitted as ribbon copy (not carbon or Xerox), in loose sheet (not stapled or bound), and accompanied by original art. Quality Xerox or similar photocopies are preferred for the two additional review copies. Manuscripts should be arranged in the following order: (Double spacing throughout text, tables, text-figures and plate descriptions, and references).

PAGE ONE. The title should be concise and indicate the major subject of theme of the paper. The author's name(s) follows the title, and complete address and postal zip code of each author is given. This is followed by a "running title" not exceeding 35 characters in length.

PAGE TWO. The abstract should outline concisely the findings of the paper. Long taxonomic lists and data table are not appropriate. Following the abstract, up to 5 key words should appear. These should facilitate correct classification in subject areas for data processing.

PAGE THREE. The text begins on page three. The text should follow the customary sequence of introduction, materials and methods, results, discussion and acknowledgments. First-order subdivisions within the text (introduction, materials, etcs.) are to be in capital letters and at the left hand margin. Second-order subdivisions are underlines (for italics), indented, at the left hand margin. Text-figure and table placement should be indicated in the left hand margin of the text in pencil.

REFERENCES. The standard journal reference must be in the following form: Sax, K. and Anderson, E., 1933. Segmental interchange in chromosomes of *Tradescantia*. Genetics 18:53-94. The standard reference extracts from collective words must be in the following form: Corbet, G. B., 1977. The pigmy shrew. *In:* Corbet, G. B., and Southern, H. N. (Eds.). The handbook of British mammals. pp. 45-47. Blackwell Scientific Publ.; London. The standard book reference must be in the following form: Calm, I. M., 1974. Omnology has passed its peak. Vanishing Press; Chicago, Illinois. Spell out the name of an author every time it is used. Note that full titles of articles are given. Rare or unusual word in journal titles should be spelled out fully.

TABLES. Tables should be complied on separated sheets. A title should be provided for each table and they should be referred to in the text. Tables can also be sent as glossy prints to avoid errors in type-setting. Efforts should be made to make the size of the tables correspond with the format of the journal. Note: Computer-generated tables must be printed our on a good quality printer. Standard-size characters produced by 9-pin dot-matrix printers are generally not acceptable.

TEXT-FIGURES. Line drawings or halftones are printed within a space of 15.6×20.4cm. They should be numbered consecutively in Arabic numbers written on the back of each figure, together with the name of the first author for permanent identification. Indicate orientation of photographs or other important aspects on the back of the prints. Indicate the scale by a bar in the photograph referred to in the legend. A complete set of text-figures should be sent with each copy of the manuscript. If a text-figure includes more than one photograph, it is essential that they be mounted so that the illustrations are butted together. Some long papers are better served by "Plates of figures" instead of text-figures.

Proof. Authors will receives page proofs together with original typescript. Corrected proofs and the original typescript should be returned to the Editor by the fastest mail within one week after receipt. In case of two or more authors please indicate to whom the proofs should be sent.

Reprints. There will be no page charge for publication in the bulletin NMNS. All papers will be published in the order in which they are accepted. One hundred reprints of each article published are supplied free of charge. Additional reprints can be ordered on a reprint order form, which is included with the proofs.

Submission of Manuscript. Send manuscript and correspondence to the Editorial Office, Bulletin NMNS, National Museum of Natural Science, Taichung, Taiwan 404, R.O.C. (學術期刊編輯室,台中市館前路一號國立自然科學博物館). Submission of an article is understood to imply that the article is original and unpublished and is not being considered for publication elsewhere.

Manuscript Acceptance Policy. It is understood that, in return for publication, the journal has the non-exclusive right to publish the contribution and the continuing right, without limit, to include the contribution as part of any reprinting of the issue and/or volume of the journal in which the contribution first appeared by any means and in any format, including computer assisted storage and readout, in which the issue and/or volume may be reproduced by the publisher.

自然科學博物館學報

第九期　　中華民國八十六年六月

目　錄