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A Review on *Warszewiczia coccinea* (Vahl) Klotzsch – the ‘Chaconia’

E. Julian Duncan

Department of Life Sciences, Faculty of Science and Agriculture
The University of the West Indies,
St. Augustine, Trinidad and Tobago
E-mail: julian.duncan@sta.uwi.edu

ABSTRACT

Warszewiczia coccinea an evergreen shrub to a small tree belonging to the family Rubiaceae, is found primarily in Central and South America and in Trinidad, where it grows in abundance in moist, semi-shaded, flat lands and the lower wooded hillsides. The plant, is known as Wild Poinsettia, Pride of Trinidad and Chaconia, the last of these is thought to commemorate the last Spanish governor of Trinidad, General Chacon. The plant is an evergreen shrub to small tree 4 - 6 m in height, which flowers at intervals throughout the year, particularly in the wet months from about February to November. A plant thought to be a mutant of *W. coccinea* was discovered in Trinidad in 1957 and was assigned the cultivar name ‘David Auyong.’ The reproductive biology, methods of propagation and known pests and diseases of the plant are recorded.

Key words: *Warszewiczia coccinea*, Chaconia, Pride of Trinidad, national flower of Trinidad and Tobago.

INTRODUCTION

Warszewiczia coccinea – a member of the angiosperm family Rubiaceae – is an evergreen shrub to small tree found growing primarily in Central and South America (Costa Rica to equatorial Peru) and Trinidad, where it grows in abundance in moist, semi-shaded flat lands and the lower wooded hillsides (Williams and Cheesman 1928).

The genus was named after Józef Warszewicz, a 19th century Polish orchid collector and inspector of the botanic gardens at Krakow, Poland, who first discovered it in Central America (Adams, 1976; http://www.arikah.net/encyclopedia/Warszewiczia_coccinea_1/24/2007). The plant is known as ‘Wild Poinsettia’ on account of its superficial resemblance to *Euphorbia pulcherrima* (Christmas plant of Mexico) of the Euphorbiaceae, to which it is in no way related. In Trinidad it is known as ‘Pride of Trinidad’ and ‘Chaconia.’ Menninger (1962) states that the latter of these two names ‘commemorates the last Spanish governor of Trinidad, General Chacon.’ Dennis Adams, as recorded by Kenny (2004), argues that “the name does not commemorate Chacon, the last Spanish governor of Trinidad and should not be spelt Chaconia”. The name is derived from Chaconne, the dance, for which dancers decorated themselves with little flags and should be spelt Chaconier. It is instructive to note that the plant is referred to as ‘Flag Tree’ in MANU Native and Medicinal Plants (http://www.enjoyperu.com/peru_travel_tours) accessed on 1/30/2007. In a later publication, Kenny (2005) in support of the use of the word Chaconier, draws attention to the fact that “for more than a generation of settlement, Trinidad culture was essentially French and the language spoken was French and French Patois, hence names such as

balisier, gommier, oliviere, chaconier.....” Williams and Cheesman (1928) record it as Chaconier.

BOTANY

Vegetative

The plant is an evergreen shrub to small tree of 4 - 6 m in height. The main trunk is short, dividing into long, slender branches at about 35 cm above ground level (Raymond 1978). The leaves are 40 - 65 cm long and 15 - 20 cm at their widest point. They are opposite, simple with an entire margin, obovate with acute bases and pinnately veined. They are supported by a short petiole enlarged at its base. A pair of deciduous stipules is found between the paired leaves.

Reproductive

The plant flowers at intervals throughout the year, particularly during the wet months from about February to November and not specifically on August 31st as may be inferred from the statement made in reference to the plant ‘coincidentally blooms on every anniversary of our Independence (August 31, 1962)’ (<http://users.rcn.com/alana.interport/flower.html>) accessed on 2007/01/29. It produces an inflorescence which is a panicle consisting of a main axis 30 - 50 cm long, along which paired, pedunculate cymes (Fig. 1) are borne. At the base of this axis and at right angles to it, are two smaller branches which also bear paired pedunculate cymes. This arrangement gives the inflorescence the appearance of an inverted ‘T.’ (Fig. 2). The entire inflorescence produces between 600 - 800 flowers.

Each flower consists of a small yellow, epigynous corolla, the petals of which are fused to form a short tube

PLATE I



Fig. 1. Cyme – oldest flower central, younger ones peripheral.



Fig. 2. Young inflorescence showing main branch and two side branches (inverted 'T').

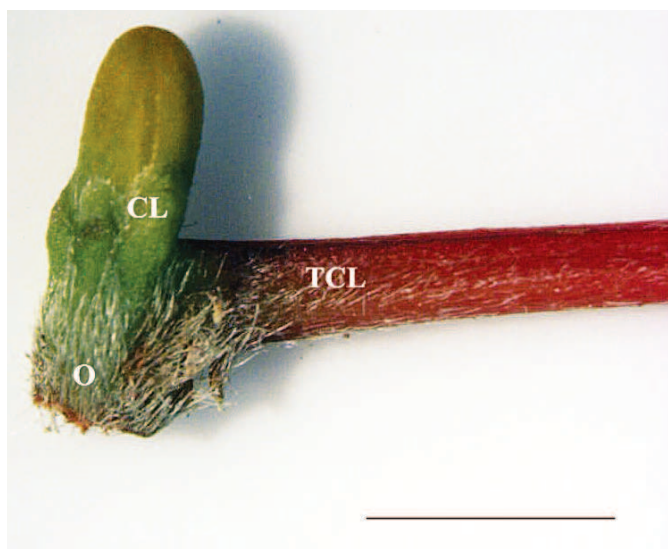


Fig. 3. Single flower showing stalk of single transformed calyx lobe (TCL). O – ovary; CL – calyx lobe. Bar 5 mm.

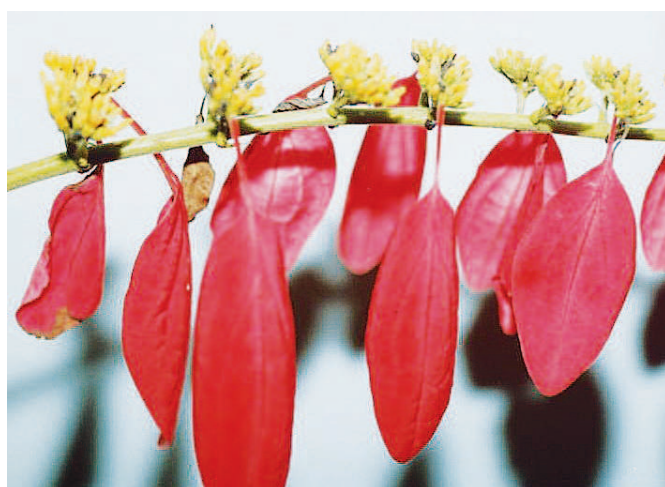


Fig. 4. Portion of inflorescence showing transformed sepals, one per cyme.



Fig. 5. Stages in the development of the flower. Stigma (S) protruding from unopened bud. Bar 2 mm.



Fig. 6. Inflorescence of the 'David Auyong' cultivar.

PLATE II



Fig. 7. Cymes of wild type; note single transformed sepal stalk at left.



Fig. 9. Fruit produced from the 'David Auyong' cultivar.



Fig. 8. Cyme of 'David Auyong' cultivar.



Fig. 17. Sepal showing leaf miner damage.

with free tips that are imbricate in the unopened bud. The calyx consists of 5 sometimes 6 sepals which are adnate to the ovary and fused for most of their length; the free tips are broad and rounded. In any given cyme which may consist of up to 30 flowers, one calyx lobe of one of the peripheral flowers is transformed into a long-stalked, obovate, red petaloid structure up to 7 cm long (Fig. 3). This feature accounts for the attractiveness of the inflorescence (Fig. 4).

The flowers are hermaphrodite; the hairy ovary is inferior (all other floral parts are above it), bicarpellate and produces numerous ovules. The style terminates in a bifid stigma. A fleshy nectary is found at the base of the style. The anthers have short filaments which are attached to the corolla tube.

The plant is protogynous, that is the pistil (female reproductive organ) matures before the anthers do. The bifid stigma protrudes through the unopened bud pushed aloft by growth of the style. (Fig. 5, 2 and 3).

The anthers dehisce after the bud has opened by which time the stigma is no longer receptive and has withered (Figure 4:4). This means that autogamy (self fertilization) is not possible; a flower must be pollinated with pollen from an older flower. After pollination and fertilization, embryo formation and seed development take place and a dry fruit – a 2-celled capsule is formed. This splits septically (along the septum separating the two carpels) in a dry atmosphere.

In 1975 a spectacular flowering tree was observed in the Blanchisseuse Valley. Nichols (1963) records the event as follows:

“Mrs. Grace Mulloon (nee Atteck), accompanied by Mr. David Auyong, spotted an outstandingly brilliant scarlet inflorescence at the top of a group of *Chaenactis*. They immediately realised the importance of their find but not until some time later, after attempts had been made at propagation, was it brought to my attention. Subsequently, Mr. Auyong and I made numerous journeys to procure suitable propagation material. It may be pointed out that, although the parent tree was apparently quite close to the road, the bole was some 2 m below road level, down a steep embankment. It is to Mr. Auyong's credit that he took considerable risks to bring the material down for propagation”.

By February of 1958 three plants from the rooted cuttings had been established at the Imperial College of Tropical Agriculture (now part of the Faculty of Science and Agriculture of The University of the West Indies at St. Augustine). Unfortunately the parent plant was cut down when the Blanchisseuse-Arima Road was widened. One of the plants established was sent to Kew (United Kingdom) in February 1961, where Mr. J. Simmonds of the Kew

tropical propagating house established four more rooted cuttings by November 1962. (Nichols, *ibid*). The plant is thought to be a mutant of *Warszewiczia coccinea* and was assigned the cultivar name ‘David Auyong’.

Raymond (1978) found both wild type and the cultivar have the same chromosome number 44. The most obvious difference between the two is to be found in the greater showiness of the inflorescence of the cultivar. In this plant, instead of one sepal of one of the peripheral flowers of the cyme becoming petaloid, one or all of the sepals of every flower in the cyme is transformed (Fig. 6).

The proliferation of transformed sepals in the cultivar obscures the presence of the petals; these are thus less obvious than those of the flowers of the wild type (Figs. 7 and 8).

In the 1982 edition of *EXOTICA International - Pictorial cyclopedia of Exotic Plants* Series 4 (Graf 1982), an illustration of the cultivar is printed with the caption ‘*Warszewiczia coccinea plenissima* (Trinidad).’ I communicated with the author, Dr. Graf in 1983, questioning the name given. In his reply he stated that he obtained the picture from a staff member of the New York Botanical Gardens (at which a plant grows), marked *Warszewiczia coccinea forma*. He substituted the ‘plenissima.’ He assured me that he has made the correction and amended the text appropriately in the 2nd Edition of his publication *TROPICA*, and planned to do the same when *EXOTICA* is reprinted.

Raymond (1978) conducted a thorough investigation of the floral biology and cytology of the ‘David Auyong’ cultivar and found pollination, fertilization, seed and fruit formation proceeded normally. The statement made by Barwick (2004) that “the double-flowered form lacks a functional pistil and does not produce fruit” is thus erroneous.

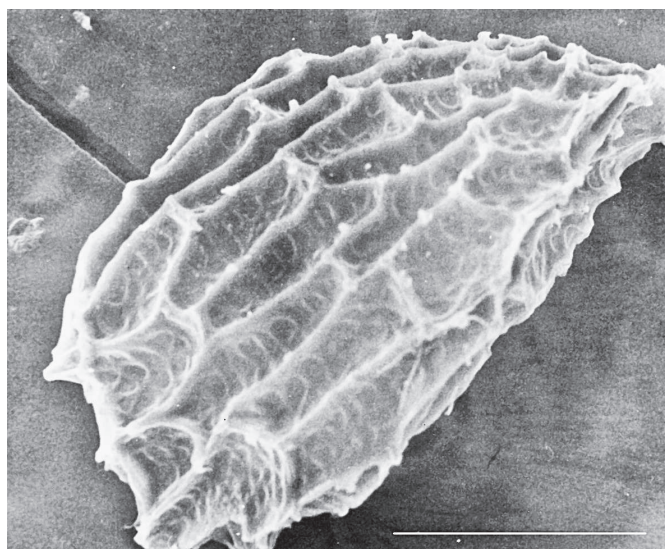


Fig. 10. Scanned Electron Micrograph of seed. Bar 50 μ m.

In a series of experiments, Raymond (1978) found that geitonogamy (transfer of pollen from the anther of a flower to the stigma of another flower on the same plant) is possible.

The fruit, as in the wild type, is a globose capsule with a scabrous surface (Fig. 9).

The seeds are minute and possess a highly ornamented testa (Fig. 10).

The fruits split septicidally under dry atmospheric conditions and the seeds are wind dispersed. At the time of dispersal the embryo is underdeveloped and still in the cigar-stage. The cotyledons are defined, but the shoot and the root apical meristems are ill-defined. The developing embryo is surrounded by a disintegrating endosperm, the whole enveloped by the one-cell-layered testa (Fig. 11).

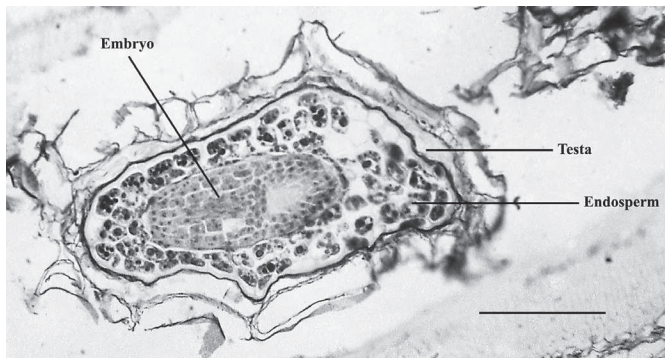


Fig. 11. Longitudinal section through seed. Bar 100 μ m.

The seed thus exhibits morphological dormancy (underdeveloped embryo) and requires a period of 10 -12 days in sunlight before it germinates. On germination, the hypocotyl emerges, pushing the cotyledons aloft still enclosed within the testa. As the cotyledons expand, the testa falls off (Fig. 12). The cotyledons are round - ovate; the outer walls of the marginal epidermal cells are curved, giving the margin a crenulate appearance. At the tip of each cotyledon there is a functionless stoma. Occasionally, a seedling with three cotyledons is seen. The seedlings

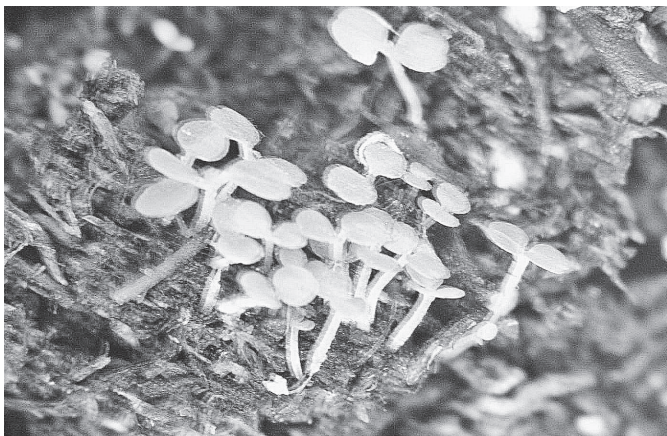


Fig. 12. 2-month old seedlings of the 'David Auyong' cultivar.

remain at this stage for months during which the root elongates and may produce laterals (Fig. 13), but the stem apex remains dormant. Efforts are currently in train at the St. Augustine campus of The University of the West Indies to determine the constraints to seedling establishment.



Fig. 13. 3-month old seedlings showing elongated root with lateral; stem apex is dormant.

PROPAGATION

Menninger (1962) with reference to the wild type recommends that the minute seeds should be dusted on to finely sifted soil in pots or seed flats and watered with a syringe. He further suggests that the pots or flats should be covered with glass to ensure warmth and a saturated atmosphere. Under those conditions germination takes place within ten days. From the foregoing it would appear that seeds of the wild type exhibit morphological dormancy as do those of the cultivar. Menninger reports that the seedlings may be transplanted after two months and are about 6 inches tall after a year's growth. Plants may also be propagated from greenwood cuttings (http://www.sun-nygardens.com/garden_plants/Warszewiczia) accessed on 2007/01/30. There are no reports on successful propagation of the cultivar by seed. Rawlings (1963) suggests that cuttings should be inserted in a mixture of peat and silver sand and placed in a propagation frame with bottom heat. Within four weeks a root system is established and the young plants may be potted in a mixture of four parts fibrous loam, two parts peat, one part sand and kept closed in the propagating frame for a further six weeks after which they may be taken to the open greenhouse with a temperature of 75 - 80°F.

PESTS AND DISEASES

Baker and Dale (1951) reported the occurrence of a fungal disease caused by *Lembrosia warszewiczia* P. Herr

on plants of the wild type in the Arena Forest. Raymond (1978) reported on an unidentified fungus which caused alternaria-like patches showing concentric circles of varying shades of brown on the 'David Auyong' cultivar.

The cultivar is claimed to be susceptible to attack by mealy bug and red spider mite (http://www.sunnygardens.com/garden.com/garden_plants/Warszewiczia accessed on 2007/01/30).

Duncan (1983) recorded damage done to the leaves and calyx lobes of the cultivar by the eriophyoid mite *Caryoloptes* sp. On the abaxial surface of the foliage leaves between the lateral veins and on both the abaxial and adaxial surfaces of the sepals, a felt of hairs (erineal patch) develops, leading to discoloration and in instances distortion (Fig. 14). These patches become brown with age. A water-soaked area above the older erineal patches is seen on the adaxial surface of the leaf.

The mites are gall forming and the effect on the leaf of the growth hormone that they produce is the proliferation of epidermal cells to form many-celled papillae (Figs. 15 and 16).



Fig. 14. Erineal patch on the abaxial surface of a foliage leaf of the 'David Auyong' cultivar.

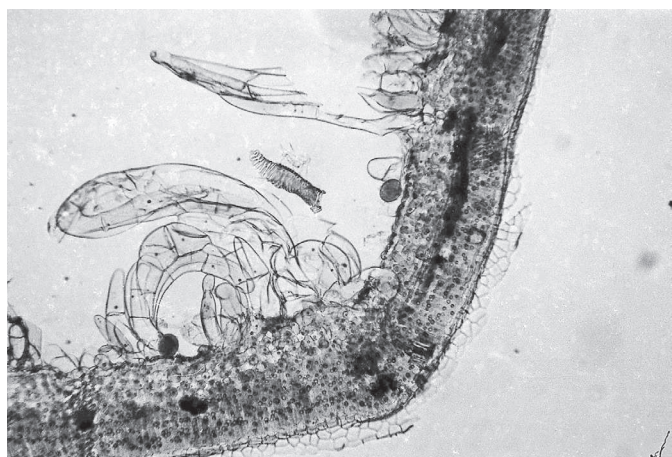


Fig. 15. Transverse section through leaf of 'David Auyong' cultivar showing septate papillae.

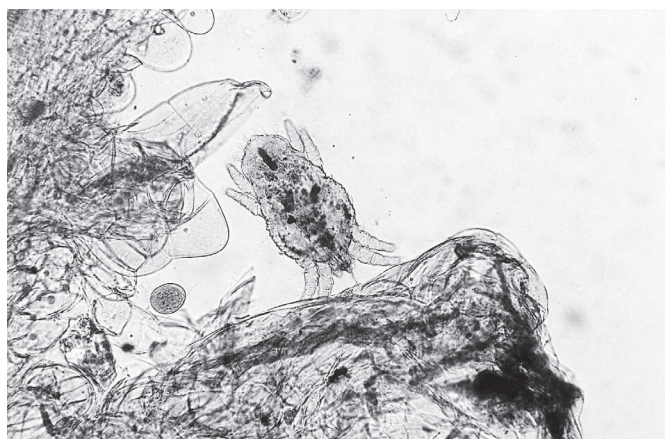


Fig. 16. Mature mite seen among papillae formed by leaf in response to attack.

Leaf miner has been found on the sepals of the cultivar (Plate II, Fig. 17).

'MEDICINAL' PROPERTIES

The anise-odoured roots are said to exhibit aphrodisiac properties (http://arikah.net/encyclopedia/Warszewiczia_coccinea) accessed on 2007/10/24.

THE NATIONAL FLOWER

When emblems were chosen for the new nation of Trinidad and Tobago, *Warszewiczia coccinea* was named the national flower for "as an indigenous flower it has been witness to our entire history. It can therefore be said to represent the imperishability of life and the continuity of our Nation". http://www.nalis.gov.tt/NationalAwardsEmblems/National_Embles2.html accessed on 2007/01/31.

The image on the 25 cent coin is that of the wild type, an indication that this is the flower the selection committee had in mind when the choice was made. The argument has been advanced that since we share the wild type in common with other countries, but the 'David Auyong' cultivar is specific to Trinidad, the latter should be considered to be designated as the national flower. There is no doubt there are those who would argue that the cultivar – discovered in 1957 – was not around to "witness to our entire history".

GLOSSARY

abaxial:	lower surface
adaxial:	upper surface
adnate:	closely attached to side of; conjoined
autogamy:	self fertilization
bicarpellate:	with two carpels

bifid:	forked
cyme:	a determinate inflorescence
epigynous:	above the ovary
imbricate:	overlapping irregularly
obovate:	inversely egg-shaped
pedunculate:	growing on or having a peduncle (stem or stalk supporting a flower or fruit)
petaloid:	like a petal
pinnate:	divided in a feathery manner
scabrous:	rough with a covering of stiff hairs or scales
septicidal:	dividing through the middle of ovary septa; dehiscing at septum

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