Ceylon Journal of Science (*Bio. Sci.*) 44 (1): 67-70, 2015
DOI: http://dx.doi.org/10.4038/cjsbs.v44i1.7343

RESEARCH NOTE

A Refugium for *Cordia subcordata* (Boraginaceae), a Very Rare and Endangered Plant in Sri Lanka and Strategies for its Conservation

A. H. Magdon Jayasuriya[1] and I. A. U. Nimal Gunatilleke[2]

[1]EML Consultants (Pvt) Ltd., No. 6/10, Rajamahavihara Lane, Pitakotte, Kotte, Sri Lanka
[2] Department of Botany, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka
Accepted May 30, 2015

ABSTRACT

In Sri Lanka, *Cordia subcordata* Lam. was known only from three locations in the vicinity of Trincomalee Bay, the first collected in 1885, the second in 1939 and the third in 1974. This tree is presently found in an unprotected coastal forest bordering the Dutch Bay, north of Puttalam Lagoon which is the only known location elsewhere in Sri Lanka, and the first recorded on the western coast. As all original habitats in Trincomalee are now highly disturbed, the coastal forests in Aruwakkalu in the west coast are considered a refugium for this very rare and endangered plant. As only a Tamil name ('Lakshikottay') has been recorded in Sri Lanka, the Sinhala name 'Moodu-lolu' is proposed for this tree. Some strategies for conservation of this species and associated ecosystems and habitats are proposed.

Keywords: Boraginaceae, coastal vegetation, rare plants

INTRODUCTION

Morphology of the species

A tree 3 – 4 m tall in Sri Lanka (reaching 7-10m elsewhere, e.g. Hawaii); leaf blade widely ovate, normally 8.5-16 cm long, 5-11cm wide, the apex acute to obtuse or rarely rounded and abruptly acuminate, the base obtuse to rounded, the margin entire but often unevenly undulate; petioles 2-3cm long; inflorescence sub-terminal, a sparsely branched loose cyme to 10 cm broad; flowers with tubular calyx 14- 17.5 mm long; corolla showy, bright orange red, funnel-form, with five flaring lobes, 3.6 – 4.2 cm long; fruit drupaceous, completely enclosed in an accrescent calyx, the end projecting in a short tube beyond the fruit, the surface smooth, shiny, the interior hard and corky and therefore, the fruit is buoyant and adapted to float in saline water and disperse over long distances (Trimen, 1895; Nowicke and Miller, 1991); (Figure 1 (a), (b) and (c).

Global distribution

The genus *Cordia* comprises about 300 species widespread in tropical and subtropical regions of the world. In Sri Lanka, it is represented by eight species, seven being native and one introduced and naturalized. *Cordia subcordata* Lam. ranges from the east coast of Africa through India, southeast Asia, the islands of the Malay Archipelago, northern Australia, the Pacific Islands and Hawaii. It is described as a common strand plant of dry areas surrounding the Indian Ocean and Pacific islands that has achieved wide distribution by water dispersal aided by special characteristics of its fruit (Nowicke and Miller, 1991). In Hawaii, this tree is cultivated and used in agroforestry for coastal protection, as a windbreak and in home-gardens (Friday and Okana, 2006).

Local distribution

In Sri Lanka, *Cordia subcordata* is extremely rare, previously recorded from only three locations, around Trincomalee Bay (Trincomalee District). It was first collected by W. Ferguson at Foul Point in 1885 and then by T.B. Worthington at Norway Point in 1939. A third collection was from Palaiyootu in Trincomalee made by L. H. Cramer in 1974 [Figure 2 (a)].

The present finding of the plant was at Aruwakkalu in Puttalam District. The habitat was the coastal forest frontier bordering the Dutch Bay, north of the Puttalam lagoon [Figure 2 (a) and (b)]. The vegetation is dense and canopies reached to 3 - 4 m in height [Figure 1 (a)] and the species occur in small populations just above the gently sloping shoreline on sandy ground. A preserved voucher specimen with mature fruits (*Jayasuriya & Gunatilleke 10164*) was deposited at the National Herbarium, Peradeniya.

Trimen (1895) and Worthington (1959) believed that the local populations in Trincomalee were originated from seeds carried over by ocean waves and naturalized. Although this proposition is a possibility, the events were not by any means recent, but ancient, as in the case of many other

*Corresponding author's email: magdonj@emlconsultants.com

coastal species distributed by trans-oceanic currents. The relatively large extent of occurrence, as revealed by the present finding of the species in the west coast, indicates that the species is truly native in Sri Lanka, and is no more considered as naturalized.

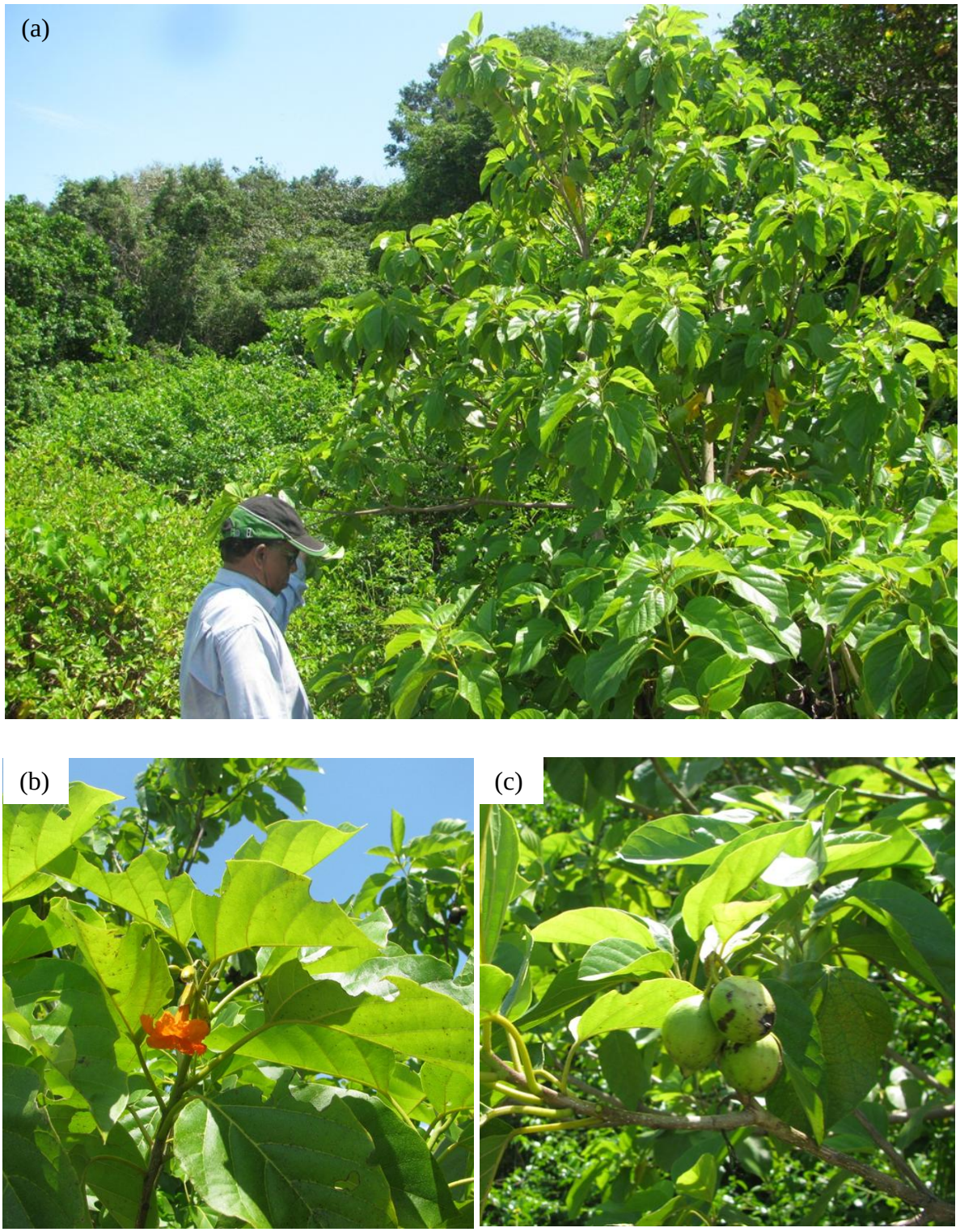

Figure 1. *Cordia subcordata* (a) tree (b) a twig in flower and (c) a twig with fruits at Aruwakkalu, Sri Lanka. (Photographs were taken on February 27, 2015)

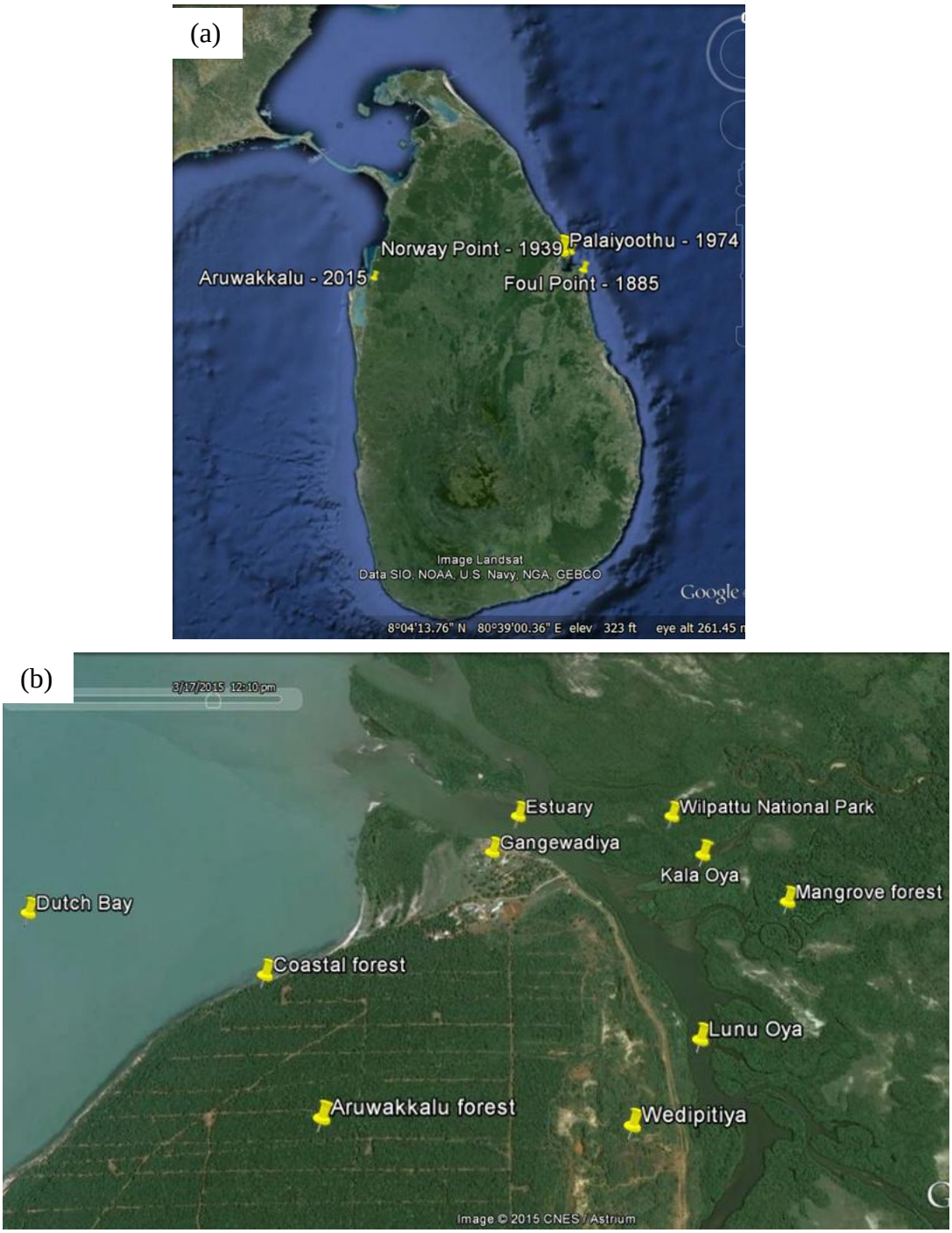

Figure 2. (a) Locations of *Cordia subcordata* in Sri Lanka: Foul Point (1885), Norway Point (1939), Palaiyoothu (1974) and Aruwakkalu (2015), (Google earth, March 17, 2015) (b) Aruwakkalu forest area (Google earth, April 17, 2015).

'Sea trumpet', 'island walnut' and 'kerosene wood' are English names recorded for this species. One Tamil name 'Lakshikottay' was recorded by Worthington in Trincomalee in 1939. As no Sinhala names are known for this plant in Sri Lanka, '**Moodu-lolu**' is proposed (moodu = sea – species is truly a coastal plant; 'Lolu' commonly refers to some other species of *Cordia*).

Conservation status and proposed strategies for conservation

According to IUCN Red List Categories and Criteria (Ministry of Environment, 2012), the present national conservation status of *Cordia subcordata* is ***endangered***, in consideration of the very low extent of occurrence, area of occupancy and number of locations.

The coastal ecosystems such as mangrove forests, coastal forests, salt marshes and sand dunes, especially outside protected areas, are highly threatened due to human activities in Sri Lanka. These activities range from fish industry, prawn farming, agriculture, tourism, settlements and mining etc. The condition of the coastal forests in Aruwakkalu area, situated south of the Wilpattu National Park (WNP), to some extent is pristine and undisturbed. However, there is no guarantee that it will remain so in the future.

The possible expansion of the existing fishing village and infrastructure development of the naval camp at Gangewadiya are immediate threats to the habitat of this species. Furthermore, the total area of Aruwakkalu has been earmarked to be mined for limestone by the Holcim (Lanka) Ltd. Although, a strip of 100 m wide inland from the lagoon shore is said to be protected from mining, it is doubtful whether it will be sufficient to conserve the biodiversity of this unique biological refugium.

Another impending danger will be the proposed Solid Waste Management Project at Wedipitiya in Aruwakkalu [Figure 2 (b)]. This has been selected as a sanitary landfill site to transport and deposit the Colombo metropolitan solid wastes presently heaped at Meethotamulla. It has been clearly shown that this project will have very serious impacts on the pristine mangrove forests in the Kala Oya – Lunu Oya estuary within and abutting the Wilpattu National Park (WNP) and Miocene fossil sites at Wedipitiya near Gangewadiya, among many other hazardous impacts on environment and biodiversity (EML, 2014). Wedipitiya is located within the WNP Buffer Zone.

Recommendations

It is recommended that a selected portion of the Aruwakkalu forest is declared as a **wildlife sanctuary** by the Department of Wildlife Conservation to ensure *in situ* conservation of the species. The proposed sanctuary should include the Kala Oya-Lunu Oya estuary, Wedipitiya (abandoned limestone excavation site), a portion of Aruwakkalu forest (Dry Mixed Evergreen Forest) extending to the lagoon in order to include coastal forests. Therefore, the proposed sanitary landfill site at Wedipitiya should be saved from development activities and an alternative site, as proposed in the EML report (EML, 2014), has to be selected for the purpose.

Cordia subcordata (‘Moodu-lolu’) is an ornamental tree and it is cultivated in some countries for its bright orange red blossoms. It is recommended that this tree can be introduced to floriculture to promote its *ex-situ* conservation. It also has a potential in agroforestry, especially in coast conservation work, and urban planting.

ACKNOWLEDGEMENTS

The first author is thankful to EML Consultants (Pvt) Ltd, especially Ms. Avanthi Jayatilleke, CEO, for providing the opportunity to conduct the EIA for a Solid Waste Management Project which enabled him to report this plant species and to uncover some interesting features on the biodiversity and ecosystems of this unique area in Sri Lanka. Both authors are thankful to the National Science Foundation and the National Committee of the Man & Biosphere Programme in Sri Lanka for facilitating a fact-finding visit to Aruwakkalu area on the February 27, 2005.

REFERENCES

EML Consultants (2014). EIA Report of the Proposed Metro Colombo Solid Waste Management Project (Draft Final Report of the EML Consultants Pvt. Ltd), submitted to Metro Colombo Urban Development Project, Ministry of Defense & Urban Development, 229 pp.

Friday, J.B. and Okana, D. (2006). Species Profiles for Pacific Island Agroforestry, 15 pp. (www.traditionaltree.org)

Ministry of Environment. (2012). *The National Red List 2012 of Sri Lanka: Conservation of the Fauna and Flora.* Ministry of Environment, Colombo, 476 pp.

Nowicke, J.W. and Miller, J.S. (1991). Boraginaceae. In: Dassanayake, M.D. & Fosberg, F.R. *Revised Handbook to the Flora of Ceylon* 7: 3 – 33. Amerind, New Delhi.

Trimen, H. (1895). *A Handbook to the Flora of Ceylon* 3: 195. Dulau, London.

Worthington, T.B. (1959). *Ceylon Trees*. Apothecaries, Colombo.