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RESEARCH NOTE

Rhynchosia velutina, a Critically Endangered Legume Crop Wild Relative in Sri Lanka

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ABSTRACT

A small population of *Rhynchosia velutina* Wight & Arn. was found in an unprotected coastal forest area, immediately south of Wilpattu National Park in the Puttalam District, during a recent Environment Impact Assessment of a site earmarked for development. This species was a legume crop wild relative known in Sri Lanka from only two previous collections in 1932 and 1973 from two protected areas in the south eastern coastal forests. The species is very rare and considered critically endangered in Sri Lanka. This new finding is the only record of this species in the west coast of Sri Lanka and therefore this location should be regarded as a refugium as it lies outside protected areas.

Keywords: rare plants, threatened species

The genus *Rhynchosia* is a member of the legume (pea) family Fabaceae and it is classified in the Tribe Phaseoleae and Subtribe Cajaninae, a group closely related to beans, pigeon peas and grams (*Phaseolus*, *Cajanus* and *Vigna* spp.). The genus *Rhynchosia*, generally known as snout bean, consists of about 200 species found throughout the tropics and subtropics, extending into temperate regions, while in Sri Lanka it is represented by 12 species (Maxwell, 1991).

Morphology

Rhynchosia velutina Wight & Arn. (Fig. 1) is a herbaceous and pubescent vine, climbing to about 2-3 m on scrub or trailing on the ground. The leaves are pinnately trifoliate with the terminal leaflet measuring about 3.5 X 3 cm (Fig. 3, 4 and 5). The flowers are with yellow petals and the pods are straight or slightly curved, hairy and 2 – seeded (Maxwell, 1991).

Global and local distribution and threatened status

This species occurs in India, Africa, Sri Lanka, Madagascar and the Comoro Islands. In all these countries it has been poorly collected and recorded in herbaria (GBIF). It was first collected in Sri Lanka in 1932 by Simpson in Bundala, later declared as Bundala National Park (Hambantota District). The specimen was deposited at British Museum (BM) and no duplicate was available at Peradeniya Herbarium (PDA). The second collection was gathered in Yala National Park (Hambantota District) by Nowicke and Jayasuriya in 1973 and this is the only specimen of the species yet available at PDA (Fig. 2A). None of these specimens have been correctly identified until Maxwell identified them as *Rhynchosia velutina* Wight & Arn., a newly recorded species for Sri Lanka (Maxwell, 1991).

According to IUCN Red Categories and Criteria, the present national conservation status of the species is Critically Endangered, in consideration of the extremely low number of locations (2) and low extent of occurrence and area of occupancy (Ministry of Environment, 2012).

Importance as a crop wild relative

Rhynchosia, being closely related to *Cajanus*, some of its species can be used to provide substantial contributions towards crop improvement in pigeon pea (*Cajanus cajan*). Furthermore, some species of *Rhynchosia* have been experimented in India to provide physiological resistance against insect pests, *e.g.* pod-borer and pod fly, in pigeon pea (Remanandan, 1981).

Rhynchosa velutina was not among 129 accessions of the subtribe Cajaninae conserved at ICRISAT in India (Remanandan, 1981). United States Department of Agriculture (USDA) also indicates that there are no accessions of *R.*

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velutina in NPGS (National Plant Germplasm System (www.ars-grin.gov.npgs). In Sri Lanka, the species is not yet conserved at the Plant Genetic Resources Centre of the Department of Agriculture (PGRC, 1999). These evidences point out the extreme rarity of *Rhynchosia velutina* in Sri Lanka and in other countries where it is known to occur.

A recent finding

This finding was made in March, 2014 during an Environmental Impact Assessment on a proposed project on Metro Colombo Solid Waste Management conducted by EML Consultants Pvt. Ltd. for the Ministry of Defense and Urban Development (EML, 2014). *Rhynchosia velutina* was found in a forest area in Aruwakkalu in Puttlam District (Fig. 3) in close vicinity of an area earmarked to be a sanitary landfill site for Colombo city's solid waste, presently deposited at Meethotamulla. The site, extending to an area of about 34.4 hectares (85 acres), has been a limestone quarry abandoned about 20 years ago by the Cement Corporation, and it is surrounded by natural vegetation consisting of somewhat disturbed Dry Mixed Evergreen Forests and Dry Deciduous Thorn Scrub at different stages of succession. The habitat of the plant that occurred in a single small population was a semi-open Dry Mixed Evergreen Forest in the immediate vicinity, *i.e.* less than 50 m from the edge of the proposed landfill site. The altitude of the site was 23 m amsl. If the proposed project is implemented, it will be imminent that this small population will be destroyed.

Permanent voucher specimens of *Rhynchosia velutina* (*Jayasuriya 10149,* collected on 5 March, 2014 and *Jayasuriya 10163,* collected on 29 April, 2014) were deposited at the National Herbarium, Peradeniya (Figs. 1 & 2B).

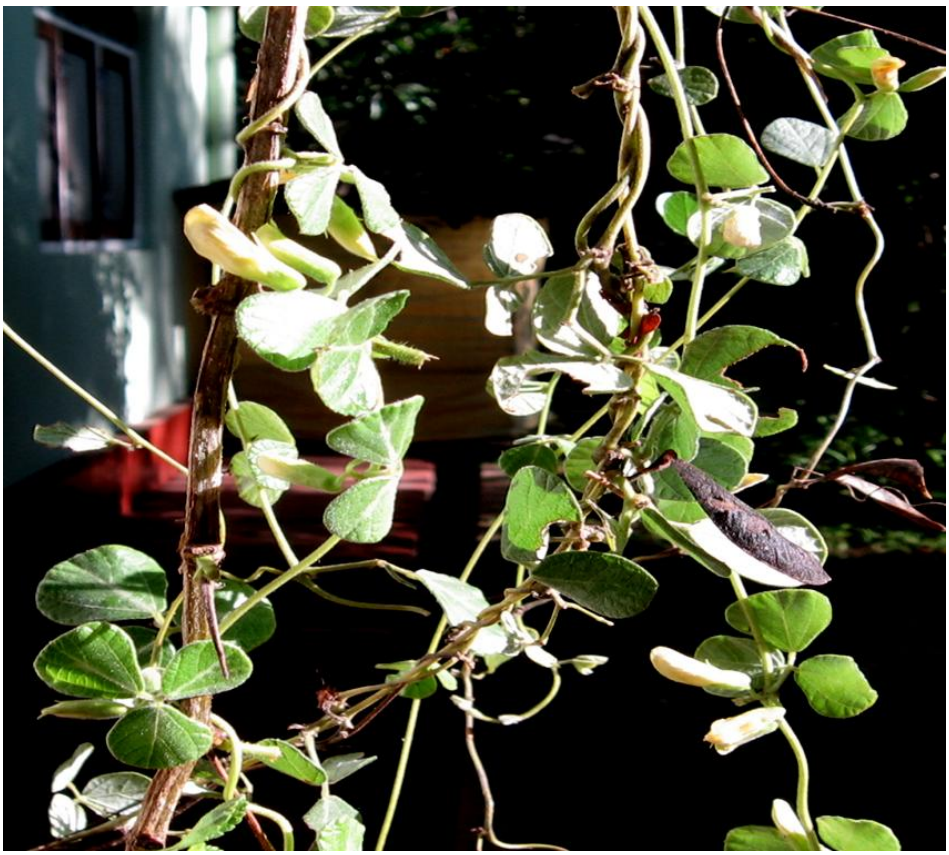

Figure 1. *Rhynchosia velutina* – Note twining habit, pinnately trifoliate leaves, un-opened yellow flowers and a dried pod (collected in Aruwakkalu, 29 April, 2014)

Figure 2. *Rhynchosia velutina* **A**. Herbarium specimen collected by J.W. Nowicke & A.H.M.Jayasuriya No. 394 on 18 July, 1973 from Yala National Park, the only specimen yet available at Peradeniya Herbarium (Courtesy: National Herbarium, Peradeniya) **B.** Herbarium specimen (unmounted) collected by A. H. M. Jayasuriya No. 10149 on 5 March, 2014 from Aruwakkalu – Note mature pods and seeds in the centre (Courtesy: National Herbarium, Peradeniya)

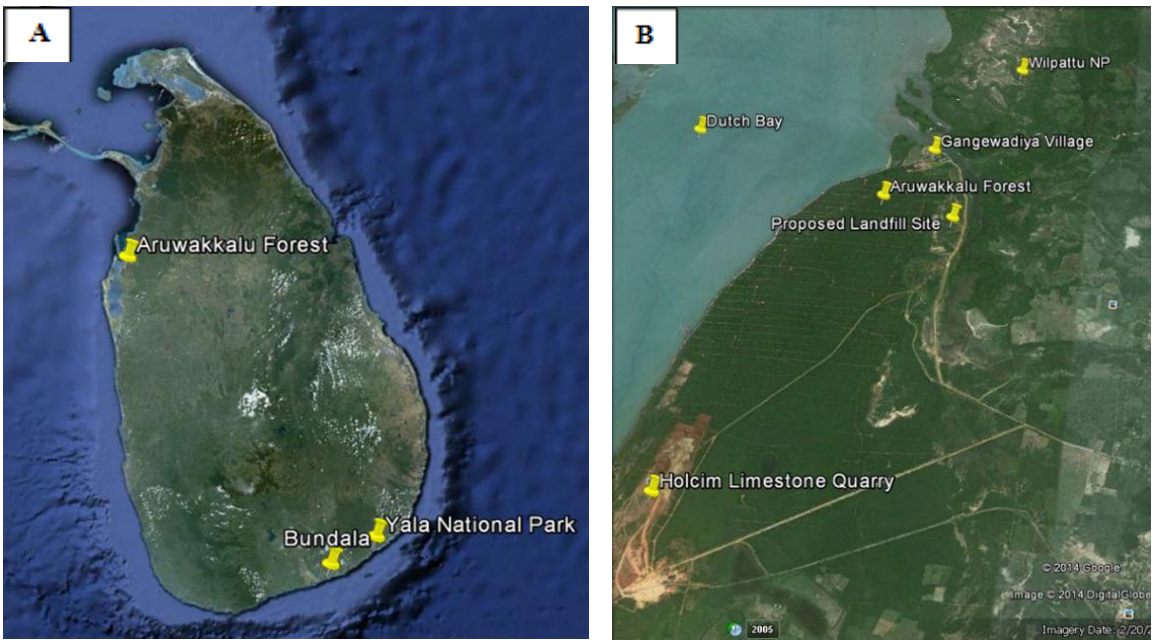

Figure 3 A. Chronological records of *Rhynchosia velutina* in Sri Lanka: Bundala (1932), Yala National Park (1973) and Aruwakkalu (2014). (Google earth, 16 April, 2014) **B**. Aruwakkalu forest area and proposed sanitary landfill site south of Wilpattu National Park (Google earth, 16 April, 2014)

As previously known locations of this species were Bundala National Park and Ruhuna National Park (Yala), both located within the southern coastal areas in the Hambantota District, the present collection will represent the only location outside protected areas and also the only record from the west coast of Sri Lanka. Therefore, it is clear that the Aruwakkalu forest is serving as a refugium for the critically endangered *Rhynchosia velutina* in Sri Lanka. The habitats of two previous records of this species (Bundala and Yala) were scrub-covered elevated sand dunes near sea shore. In contrast, the habitat of the new locality in Aruwakkalu was open Dry Mixed Evergreen Forest on relatively more elevated ground (23 m amsl) with Reddish Brown Earths. It is further noteworthy that this species has not been recorded in the Wilpattu National Park, a site that has been intensively investigated by many botanists and ecologists from which many botanical specimens have been gathered in the past. This indicates the extreme rarity of this species in Sri Lanka

Impacts of development activities on biodiversity in Aruwakkalu forest

The Aruwakkalu forest area is apparently earmarked to be mined for limestone for the manufacturing of cement. The South western parts of this forest has been intensively mined for limestone by Holcim Lanka Pvt Ltd and used for production of cement at the factory in Puttalam. It is recommended that carefully selected areas of the Aruwakkalu forest be conserved for the sake of biodiversity conservation.

A recent exercise in translocation of rare and threatened fauna in the Holcim limestone quarry site at Aruwakkalu has revealed the existence of many rare and threatened fauna (Kumarasinghe *et al.*, 2013). The most significant record made during the survey was that of the endemic *Geckoella yakhuna* (Blotch bowfinger gecko), a very rare and highly threatened gecko species affected by habitat loss. Furthermore, other rare and nationally threatened reptiles such as *Chamaeleo zeylanicus* (Sri Lankan Chamelion), *Chrysopelea taprobanica* (Sri Lankan flying snake) and *Liopeltis calamaria* (Reed Snake) were recorded in the proposed quarry site. These investigators have recommended the integration of biodiversity conservation aspects into the limestone mining industry at Aruwakkalu (Kumarasinghe *et al.*, 2013). This recommendation is further fortified by the finding of the present survey on the flora at Aruwakkalu.

A proposed vernacular name

No local name for this species in Sri Lanka is known. Therefore, the Sinhala name **'Bu-kollu'** is proposed for *Rhrynchosia velutina*. 'Kollu' is the grain legume *Macrotyloma uniflorum* (Horse gram), and with appropriate prefixes, 'kollu' also refers to various members of the Tribe Phaseoleae (*e.g*. "Gas-kollu' for *Rhynchosia cana* and "Maha-wal-kollu" for *Rhynchosia minima*). The proposed prefix, 'Bu' refers to the pubescence of the plant.

REFERENCES

GBIF. Global Biodiversity Information Facility. www.gbf.org (14 April, 2014).

EML Consultants Pvt. Ltd. (2014). EIA Study on the proposed project on Metro Colombo Solid Waste Management – Transfer of Solid Waste through a Waste Transfer Station via rail to proposed Sanitary Landfill at Aruwakkalu. A report submitted to the Ministry of Defense and Urban Development.

Kumarasinghe, A., Pradeep, W.A.A.D.G., Peabotuwage, P.I.K., Wickramaarachchi, R.G.A.T.S., Somarathne, S., Perera, B.N.H., Abeyawardane, U.T.I, Wijesinghe, M.R. and Karunarathna, D.M.M.S. (2013). An attempt to reduce impacts of limestone quarries through biodiversity assessment and translocation: A case study at the Holcim Limestone Quarry Site in Puttalam, Sri Lanka. *Asian Journal of Conservation Biology* **2** (1): 3–20

Maxwell, R.H. (1991). Tribe Phaseoleae in Fabaceae. In: Dassanayake, M.D. & Fosberg, F.R. Revised Handbook to the Flora of Ceylon 7: 236- 283. Amerind, New Delhi.

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

PGRC. (1999). Plant Genetic Resources Catalogue. Plant Genetic Resources Centre, Department of Agriculture, 259 pp.

Remanandan, P. (1981). The wild gene pool of *Cajanus* at ICRISAT, Present and Future. In Proceedings of the International Workshop on Pigeon-peas Vol. 2. 15-19 Dec. 1980, Patencheru, A.P., India.