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Interception of live exotic species *Cordylomera spinicornis* (Fabricius) (Coleoptera: Cerambycidae) in Tali wood imported from African countries

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Abstract

Logs of Tali *Erythrophleum suaveolens* imported to India from African countries for uses ranging from structural material for construction to finished products like firewood, shade, ornamental (avenue tree), joinery, flooring, turnings, construction and bridges. It is also used in boat building and marine construction. *Cordylomera spinicornis* (Coleoptera: Cerambycidae) intercepted on these logs is not known to occur in India.

Keywords: Tali, wood logs, *Cordylomera spinicornis*, import, Exotic species, Erythrophleum

Introduction

India has been losing about 50,000 hectares of forest cover per year due to various reasons like agriculture, commercial logging, mining, urbanization and industrialization etc. and hence wood imports have become more important. India's wood imports combined hardwood and softwood logs and hardwood and softwood lumber is around 7.5 million cubic meters. Wood is sourced from countries such as Malaysia (33%), New Zealand (23%), Myanmar (23%), Costa Rica, the Ivory Coast, Ecuador, Ghana, US, Europe, Canada Vasudev, 2017) [2]. In 2013-14 Myanmar alone shipped 1.6 million tons of high quality teak to plywood peelers in India prior to ban of wooden log exports. (Vasudev, 2017) [2].

Tali wood (*Erythrophleum suaveolens*) is widespread in tropical Africa from Senegal to Mozambique. It belongs to the family Caesalpiniaceae. It grows in lowland rain forest, woodlands and thickets in Uganda; most common in Bunyoro and lake-side forest, 1,000-1,500 m. It is used for Firewood, charcoal, timber, shade, ornamental (avenue tree), joinery, flooring, railway sleepers, harbor and dock work, turnings, construction and bridges. It is also used in boat building and marine construction. The colour of the heartwood is yellowish brown to reddish brown and darkens upon exposure. The sapwood is distinctive in the whitish to pinkish-white colour. Fine pores, scattered and numerous. Texture is medium and uniform. This is very high density, resulting in a very hard wood. Excellent stability, with high bending strength qualities.

These imports feed 26,000 saw mills and 2500 plywood and veneer factories in India. 92% of all imports of wood have been round logs. Therefore, exotic insect pests associated with these logs are of biosecurity concern to India.

Cordylomera spinicornis (Cerambycidae: Coleoptera) is native to Africa, being reported from many countries such as Angola, Benin, Cameroon etc. Throughout its native range, *C. spinicornis* primarily infests species in the family Meliaceae such as *Entandrophragma*, *Guarea*, *Khaya*, *Lovoa*, *Trichilia*, and *Turraeanthus*. In addition, trees in the genera *Acacia*, *Baphia*, *Celtis*, *Funtumia*, *Guarea*, *Lasiodiscus*, *Teclea* and *Theobroma* have been infested in Africa (Duffy 1957, 1980; Roberts 1969; Wagner *et al.* 1991) [3, 4, 5].

There are more than 36,000 species of Cerambycidae (Coleoptera) recognized worldwide and they are found on all continents except Antarctica (Linsley 1959, 1961) [6]. Nearly all cerambycids are phytophagous, feeding primarily on woody plants, although some species do feed on herbaceous plants. Cerambycids develop in nearly all parts of woody plants, especially in roots, trunks, and branches, but occasionally also in seeds, pods, cones, and leaves.

In addition, cerambycid larvae develop in nearly all major tissues in woody plants, including outer bark, inner bark, cambium, sapwood, heartwood, and pith.

Cerambycids utilize a wide diversity of woody plants as larval hosts, but certain plant families serve as hosts to many cerambycid species, while others are rarely used. Cerambycids infest trees in a wide variety of host conditions (Haack and Slansky 1987; Mattson and Haack 1987; Hanks 1999) [8, 9]. Some cerambycids infest living trees that vary in condition from healthy to stressed, including many species of Anoplophora, Enaphalodes, Goes, Lamia, Megacyllene, Oberea, Oncideres, Plectrodera, and Saperda. By contrast, many species of Arhopalus, Ergates, Parandra, and Rhagium commonly infest dead trees (Craighead 1923; Linsley 1959; Bílý and Mehl 1989; Solomon 1995) [6, 11, 12, 13]. In addition, some dead-wood infesting species prefer moist wood (Mallodon and Rhagium), while others prefer dry wood (Chlorophorus, Hylotrupes, and Stromatium) (Craighead 1923; Duffy 1953; Linsley 1959; Bense 1995) [14, 6, 11, 15]. Because of their requirements for specific host conditions, there is a succession of cerambycids and other wood borers that occur as a living tree first declines, then dies, and later decays (Blackman and Stage 1924; Graham 1925; Savelly 1939;

Haack *et al.* 1983; Khan 1985; Harmon *et al.* 1986; Hanula 1996; Saint-Germain *et al.* 2007; Lee *et al.* 2014) [17, 16, 18, 23]. With respect to forestry, such host requirements reveal why some cerambycids are pests primarily of living trees, while others are mostly pests of stressed or recently felled trees or logs, and still others are pests of lumber and wood products.

Materials and Methods

All wooden logs imported to India are inspected as per the Plant Quarantine Order (Regulation of Import into India) 2003 and Standard Operating Procedures for Import inspection. During one such inspection in August 2017, Plant Quarantine Station, Mangalore found live adults of Cerambycid beetles in the imported Tali wooden logs (*Erythrophleum* sp) from Cameroon.

Intercepted insects were collected in vials contains chloroform dip paper and has sent to Dr. Kolla Sreedevi, Senior Scientist, Division of Entomology, ICAR-Indian Agricultural Research Institute, New Delhi for identification. Overall body length was measured from the apex of the labrum to the apex of the abdomen. The family wise and wood wise distribution of insects on imported timber were analysed.



Fig 1: Preserved specimen of *C. spinicornis*

Results and Discussions

The analysis revealed that the beetle reported on imported tali wood from African country Cameroon to India is of global distribution. The taxonomic status of the identified species revealed that, Coleoptera is the order of insect. *Cordylomera spinicornis* is a known genus but reported for the first time in India. The *C. spinicornis* belonging to family Cerambycidae, has come to India for the first time through wood import.

The present study revealed that, adult beetle measure 13 – 25 mm long, they attack mature living trees and recently felled logs of various species of Tali wood. This kind of species has various shades of green, blue, and bronze color of Elytra. But in all the species, elytra has shown some extent to shining metallic. The antennae of beetles are carrying strong spines (Fig2.) (Duffy 1957) [3]. Adults typically emerge during the dry season in November to February, and on an average lay 30 eggs on the bark crevices and freshly cut logs (Roberts 1969) [4]. The larvae of *C. spinicornis* feed first as engravers of the sapwood, later it enters the outer 5 cm of sapwood for pupation (Duffy 1957) [3]. Infested trees exhibit slight gum flow (Schabel 2008). Although infestation levels can be high, maximum damage is restricted to the outer 5 cm of the logs (Duffy 1957) [3]. Population can reach high levels in timber yards where logs are sorted and stored (Duffy 1957; Roberts 1969) [3,4]. Their development probably takes years.

It has been reported earlier from many countries such as

Angola, Benin, Cameroon, Central African Republic, Democratic Republic of Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Ivory Coast, Liberia, Malawi, Mozambique, Niger, Nigeria, Republic of Congo, Senegal, Sierra Leone, Sudan, Tanzania, Togo, Uganda, and Zaire (Duffy 1957; GBIF 2014) [3]. Although *C. spinicornis* apparently has not yet become established outside of Africa, adults have commonly been intercepted in many countries on imported wooden logs (O'Connor and Nash 1984; Cocquemot and Mifsud 2013; Rassati *et al.* 2015) [27, 28, 29].

The analysis further revealed that there is a chance for bio invasion through wood import. There was also a chance that insects could get recruited on the imported wood once it is landed on Indian soil. Plant Quarantine Order (Regulation of Import into India) 2003 with many amendments currently enforces the Sanitary and Phytosanitary (SPS) agreements in relation to wood import, treating timber as a separate item and requiring Phytosanitary Certificate with treatment for wood import. It is expected that the “bioinvasion” (The rapid expansion of a species into regions where it did not previously exist, often as a result of human agency) is being monitored and controlled now by the stringent enforcement of PQ order, 2003 under the DIP act 1914. Because these “invasive or exotic” species can be a destabilizing influence in ecosystems that lack the natural enemies needed to check the spread of exotics.

The chances of exotic wood insects and fungi becoming invasive to India is very less. Even if they reach through wood, due to the strict phytosanitary action like methyl bromide fumigation at the port of entry at a country of import, further distribution and spread is completely restricted in a

dead state. Therefore it is very important to know the statistics of the import of tali wood into India. From Plant Quarantine Mangalore station tali wood has imported from different countries which are mentioned below with details.



Fig 2: Live *C. spinicornis* adult on tali log

Table 1: Details of Tali logs imported through PQS, Mangalore

Sl No.	Name of the country	Imported Year and Quantity (metric tonnes)			
		2016-2017	2017-2018	2018-2019	Grand Total
1.	Angola	1008.428	235.330	Nil	1243.758
2.	Cameroon	1841.081	1346.774	1114.851	4302.706
3.	Central African Republic	Nil	20.742	730.082	750.824
4.	Ecuador	46.980	Nil	Nil	46.980
5.	Zimbabwe	149.763	296.735	Nil	446.498
6.	Congo	Nil	1194.226	614.205	1808.431
Grand total		3046.252	3093.807	2459.138	8599.197

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