SPECIES COMPOSITION OF LONGHORN BEETLE (FAMILY CERAMBYCIDAE) IN RESEARCH AND EDUCATION FORESTS OF COLLEGE OF AGRICULTURE SCIENCE AT SANGATTA, INDONESIA

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I. INTRODUCTION

Karangan is the name of a district located in the East Kutai Regency, East Kalimantan Province, Indonesia. This district can be achieved by car for 6 hours from Sangatta (regency capital).

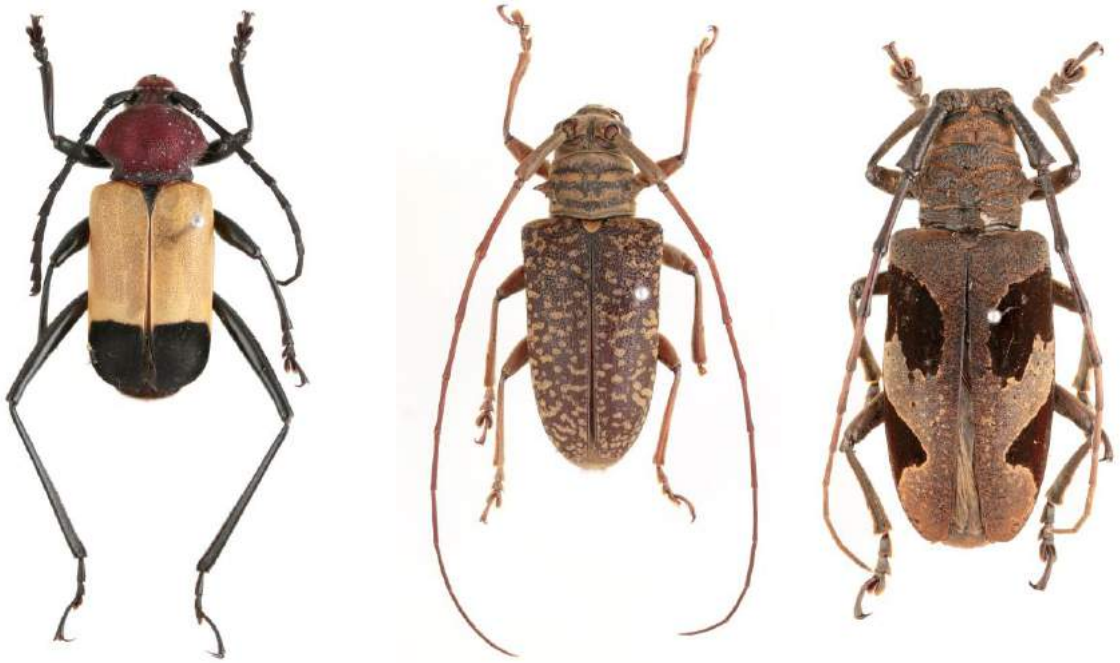
There is remaining primary and secondary forests on lowland limestone hills. About 10.68 ha of land is allocated as a Research and Education Forests of College of Agricultural Science (Stiper) at Sangatta.

These areas include the remaining natural and secondary forests are composed of limestone, where information on biodiversity is still limited.

One of the insect family that is important in the forest ecosystem is the beetles of the family Cerambycidae which are included in the order of Coleoptera.

The Cerambycidae acts as a detrimental pest because the larvae drill into wood, so they can cause extensive damage, on living trees, dead trees, processed wood and old houses wood. But there is also act as pollinators and is used by people for delicious food.

The objectives of this study are to describe the species composition of longhorn beetles of the family Cerambycidae present in the REF as a basic information for biodiversity conservation in limestone forests.



II. MATERIALS AND METHODS

2.1. Study Site and Time of Study

This study was conducted in Research and Education Forests at Karangan Subdistrict, East Kutai Regency, East Kalimantan Province (Fig 1).

Fig 1. Study site at Karangan Subdistrict, East Kutai Regency, East Kalimantan Province

Plot sample was established at four habitats, i.e. primary forest (PF) (1°25'25" N and 117°37'45" E, secondary forest (SF) 1°25'22" N and 117°37'46" E, cocoa garden CG) 1°25'9" N and 117°38'8" E, oil palm garden (OG) 1°25'26.8" N and 117°38'3.2" E (Fig 2).

Fig 2. Position of study plots at karst area

The first field trip was conducted in February 2017, the second was in July 2017, the third was in February 2018 and the fourth was in August 2018 at the same location.

2.2. Establishment of Plot Sample

The sample plot measuring 100 m x 100 m was established in natural primary forest and the remaining two plots (1 ha each) in secondary forest for tree species observation.

Each sample plot is subdivided into 25 subplots (20 m x 20 m) (Fig 3). There are 75 sub-plots with a total of 3 ha. Cocoa and oil palm plantations (1 ha each) were prepared as a comparison (control). All plots are placed in a flat place.

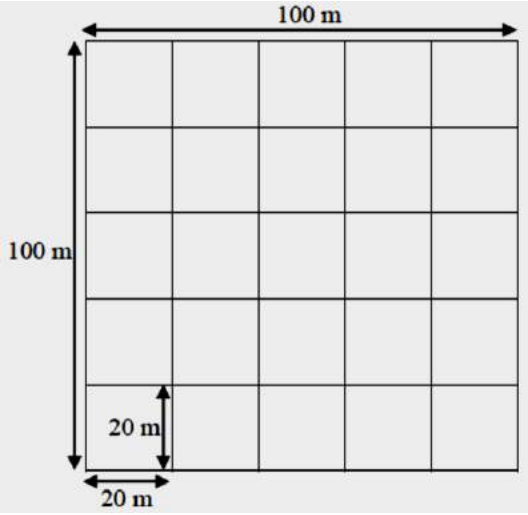


Fig 3. Plot and subplot samples for recording of tree species

2.3. Trap Instalation

The traps used in this study were as in Fig 4, mainly leaves and small branches of *Artocarpus heterophyllus* (jackfruit), malaise trap, and light trap.

The *Artocarpus heterophyllus* (jackfruit) and malaise traps were set in the four corners of plot sample, one trap respectively.

Fig 4. Installed traps for capturing longhorn beetle in the study site

III. RESULTS

3.1. Composition of Beetle Species at Different Times of Capturing

There were 31 species found in February 2017 with 144 individuals, 22 species with 92 individuals in July 2017, 44 species with 266 individuals in February 2018 and 40 species with 155 individuals in August 2018 (Fig 4). The total number of beetles captured from four field visits was 74 species with 657 individuals, consisting of 2 subfamilies and 17 tribes.

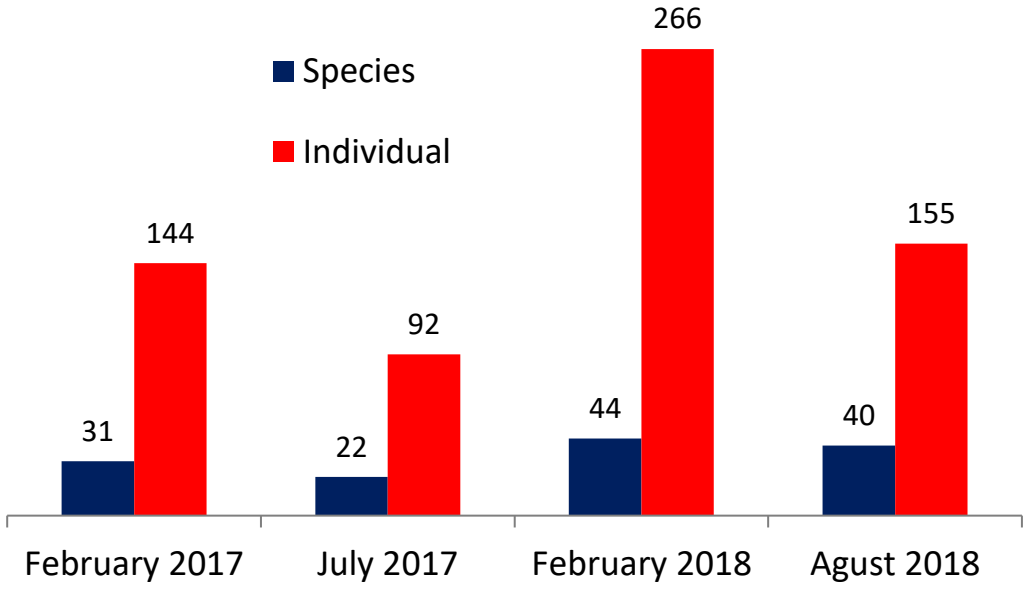


Fig 5. Species and individuals number of longhorn beetle at different time of capturing

There were 15 different species of beetles always present at different capturing months, namely *Acalolepta rusticatrix*, *Atimura bacillima*, *Epepeotes luscus*, *Epepeotes spinosus*, *Glenea* (*Glenea*) *funerula*, *Glenea* (*Glenea*) sp., *Gnoma longicollis*, *Nyctimenius ochraceovittata*, *Pterolophia annulitarsis*, *Pterolophia crassipes*, *Pterolophia melanura*, *Pterolophia obliquefascioculata*, *Ropica angusticollis*, *Ropica marmorata sarawakiana* and *Sybra* (*Sybra*).

The most abundant captured species from the four field trips were *Acalolepta rusticatrix* (157 individuals), followed by *Epepeotes luscus* (58 individuals), *Pterolophia melanura* (59 individuals) and *Nyctimenius ochraceovittata* (54 individuals).

3.2. Composition of Beetle Species at Different Habitats

The species of beetles found in SF was the most (54 species), followed by PF (33 species), CG and OG (14 species, respectively) (Fig 6).

The highest number of individuals of beetles was in SF (383 individuals), followed by PF (175 individuals), CG (59 individuals) and the least in OG (40 individuals).

The total number of beetles captured in all habitats was 74 species with 657 individuals.

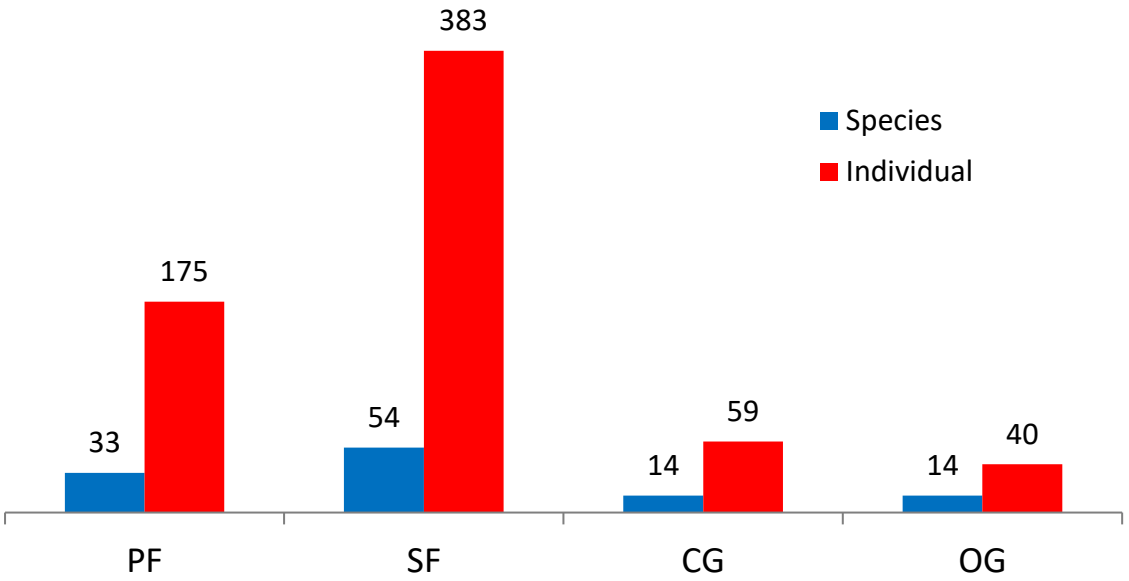


Fig 6. Species and individuals number of longhorn beetle at different habitat. PF = primary forest. SF = secondary forest. CG =cocoa garden. OG = oil palm garden

Acalolepta rusticatrix was the most common species in PF and SF (39 and 98 individuals, respectively), while *Pterolophia melanura* was the most common species in CG and OG (26 and 11 individuals, respectively).

Acalolepta rusticatrix, Epepeotes luscus, Pterolophia melanura and *Ropica marmorata sarawakiana we*re always present in four habitats, which means they were adaptable to habitats of different conditions.

In the secondary forest, there were some longhorn beetles found in dead lianas, i.e. *Demonax detartus* in *Artabotrys rosea*, *Golsinda* sp. in *Bauhinia flammifera*, *Dystasia circulata* in *Desmos cochinchinensis*, *Chlorophorus dimidiatus* in *Merremia dumosa*, and *Aelolesthes* sp. in *Vitis pedunculari* (Fig. 7). The beetles might be feed the dead lianas and also for their habitats of life cycles.

All species of longhorn beetles captured in Karangan Education and Research Forests of Stiper are shown in Fig 8.

IV. CONCLUSION AND SUGGESTION

4.1. Conclusion

In the Research and Education Forests whose area is dominated by limestone hills, there were quite a number of species of longhorn beetles.

The composition of beetle species varied in different capture time, the highest species number of capture time was in February, both for the number of species and the number of individuals.

Secondary forest was the habitat most favored by longhorn beetles compared to primary forest, cocoa and oil palm plantations.

4.2. Suggestion

It is necessary to maintain the existence of natural forests, both primary and secondary for the survival of beetles in particular and insects in general, because they play an important role in decomposing wood and other plant remnants as well as pollinators for plant propagation.

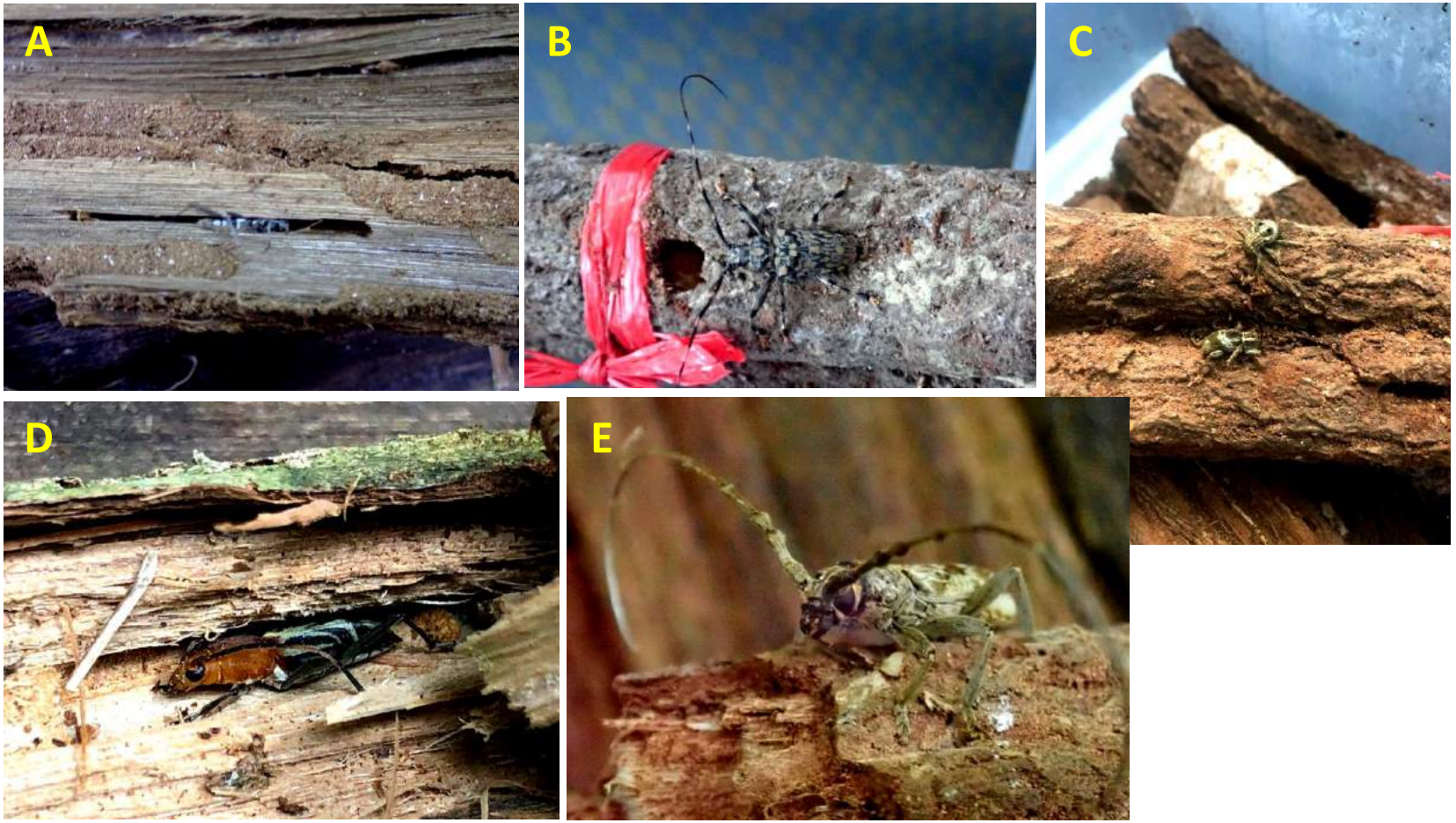


Fig 7. Longhorn beetles in the dead stem of lianas. A) *Demonax detartus* in *Artabotrys rosea*. B) *Golsinda* sp. in *Bauhinia flammifera*, C) *Dystasia circulata* in *Desmos cochinchinensis*, D) *Chlorophorus dimidiatus* in *Merremia dumosa*, and E) *Aelolesthes* sp. in *Vitis pedunculari*

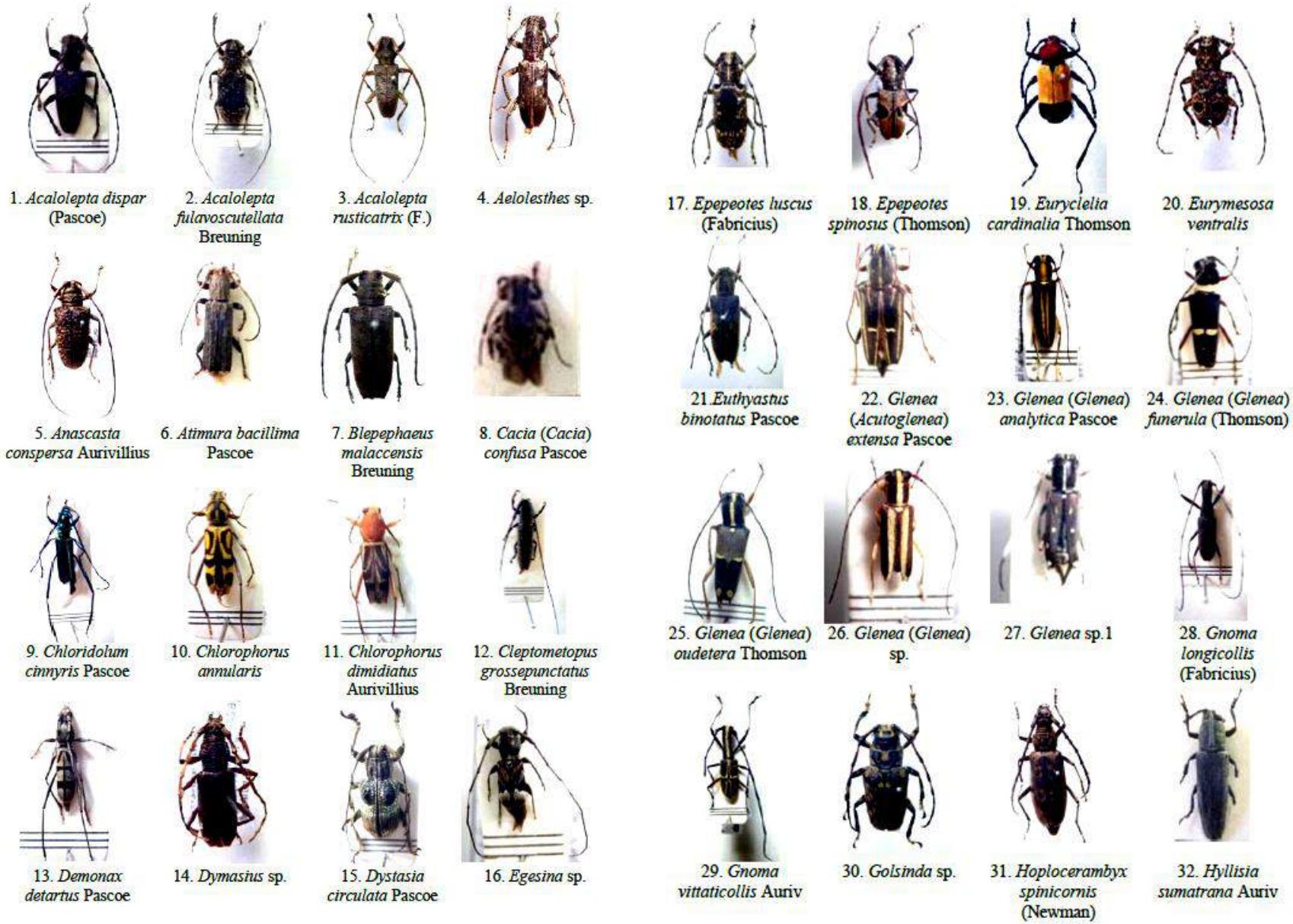


Fig 8. Longhorn beetles captured in the Research and Education Forests of College of Agriculture at Karangan