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Inventories of alternative host plants of lac insect others than kesambi in Lombok island

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Abstract

Lac insect (*Laccifer lacca*, Kerr) can be deleloped because of lac production that are useful for vernis, electric industry, glue, varnish, cables, etc. Kesambi (*Schleichera oleosa*) is host plant of lac insect but field survey showed that *Mangifera indica* and *Albizia chinensis* around kesambi were also infested by lac insect and capable of producing lac. The aim of research was to obtain kind of plants other than kesambi that potentially could formed the most productive lac either in quantity or in quality. Descriptive method was used in this study. The results showed that several plants both annual and wild plants around kesambi were potential to be the alternative hosts for lac insect. Those several plants were mangga (*Mangifera indica*), sengon (*Albizia chinensis*), sonokling (*Dalbergia latifolia*), kaliandra (*Calliandra calothyrsus*), ara (*Ficus carica*), langgem (*Caesalpinia decapetala*), boran (*Pueraria montana*), tempulat (*Arctium minus*), telean/tembelek (*Lantana camara*), kesembung, lengkukun, and kentawong, but only *Mangifera indica*, *Albizia chinensis*, *Dalbergia latifolia*, *Calliandra calothyrsus*, *Ficus carica*, *Caesalpinia decapetala*, and *Pueraria montana* could produced lac. Lac produced by those plants were varied.

Keywords: *Laccifer lacca, alternative host plants, Lombok island*

Introduction

One of non-timber forest product in forest region residents is development of *shellack* or lac. From production of lac insect *(Laccifer lacca, Kerr*) development can be obtained lac that are useful for making vernis, electric industry, varnish, glue, and cables. Besides, lac is also used to make *edible dye* of soft drink and food, and as mixing ingridients for outside layer of chocolate. Water waste of lac processing that contain lakaik acid can also be used to wool tanning, silk tanning, or skin tanning, etc. (Kasmojo, 2007).

In Lombok island, up to now lac insect culture is based on kesambi as host plant which lac insect will form aggregate at branches of kesambi plants. Lombok

island has a great potential to grow kesambi plants. Around 150 hectare planted area have been developed for kesambi plants (Dinas Kehutanan NTB, 2009).

Asep and Intari (1997), Iqbal (1993), and Green (1995) stated that beside kesambi, jamuju (*Cuscuta australis*), Caliandra (*Calliandra calothyrsus*), *Acacia catechu, Acacia filosa, Butea sp, Cajanus cajan,* beringin *(Ficus sp.)* can be used as host plants of lac insect. Yield and quality of branch lac produced will be affected by difference of kind of host plants especially degree of liquid acidity and sap density of host plants (Radijanto, 1979).

Based on field observation and survey result restricted on one location of kesambi plantation that were already infested with lac insect and produced lac, there was interesting phenomenon that two plants other than kesambi at the same location were also potential to be lac insect hosts. For example, manggo (*Mangifera indica*) and sengon (*Albizia chinensis*) produced lac the same as kesambi. Lac produced on sengon branches was thicker than that was on kesambi branches.

Several countries as lac producer also have different host plants other than kesambi as lac insect hosts. For examples, India has *Butea monosperma* (Ploso) and *Zizypus mauritana* as a good lac insect hosts, and Thailand uses *Samanea saman* as lac insect hosts (Green, 1995). In East Sumba, they use kesambi, bidara, and beringin as lac insect hosts (Rochayah dkk, 2012). Based on these, it was interesting to study alternative hosts other than kesambi that produce lac both in high quantity and quality that are specific of Lombok island.

Methodology

Descriptive method was used in this study. Observation was done on kesambi plantation in Sugian village around 35 hectare and Lendangbatu village around 150 hectare in Sambelia Subdistrict, East Lombok regency. Sampling area used in Sugian village was about 1.5 hectare and Lendangbatu village 7.5 hectare (5% from kesambi planted area in each region).

Plants that were potential to infect by lac insect were observed around kesambi plantation near society residents at several determined location points. Location used were Sugian and representative of Lendangbatu village were Penjaruman and Darakunci. Variables observed on each potential host were kind of

plant, attack intensity of lac insect, contagion length, and contagion fullness, and branch diameter. Observation were done every two weeks (5 months observation).

Result and Discussion

Observation showed that host plants potentially infect by lac insect in three location were almost the same. Besides annual plants, there were wild plants that also potential to be infect by lac insect. Inventories result were described below.

1. Mangga (*Mangifera indica*): three branhes were infested by lact insect (attack intensity of lac insect ± 6% with 50 potential branches to be infested) and formed lac but unsmooth contagion (contagion fullness ± 10-15% with contagion length 5-10 cm and branch diameter 1-2 cm).

2. Sengon (*Albizia chinensis*): lac formation on sengon branch was thicker than that on mangga branch and contagion fullness was also longer (contagion fullness ± 20-30% with contagion length 15-40 cm and branch diameter 1-2 cm). Attack intensity of lac insect was ± 10% with 20 potential branches to be infested (sengon plant was still young, if mature more than 50 branches can be infested).

3. Sonokeling (*Dalbergia latifolia*): in Penjaruman village near kesambi plants was faound a small sonokeling plant about 75 cm and it was already infested. This contagion was observed by white layer on main stem or branches. Attack intensity was 100% because almost all branches and main stem were infested. Contagion length was ±60 cm with branch diameter about 1 cm. Further observation showed that white layer was thinner and lac was already formed about 20 cm on main stem, the rest lac was formed but they were still small and unsmooth.

4. Langgem (*Caesalpinia decapetala*): these plants were a wild plants around kesambi and were potential to be infested by lac insect. Contagion length was ±10 cm with branch diameter ± 1 cm, contagion fullness ±20% with attack intensity of lac insect ± 15-20% with 5-6 potential branches to be infested.

5. Boran (*Pueraria Montana*): was a plant creeping up the kesambi plant with stem diameter around 1 cm. These plants were potential to be infested by lac insect with

contagion length ±70 cm. Length of stem can reach 2 m. Attack intensity of lac insect ± 20-25% with 4-5 potential branches to be infested.

6. Tempulat/*common burdock* (*Arctium minus*): these plants were wild plants around kesambi. Almost all branches were infested (attack intensity of lac insect 100%) marked by white layer on branches surfaces. Contagion length were varied from 3-7 cm with branch diameter 1 cm.

7. Telean/Tembelek (*Lantana camara*): this wild plants were also found near kesambi plants. Only one branch was infested (attack intensity of lac insect ±20%) but many of them were found in observation area. . Contagion length was 3-10 cm and branch diameter ±1 cm.

8. Kesembung: these plants were also wild plants around kesambi. A white layer contagion was found on the branches with diameter ±1-1,5cm. Contagion length was 1-2 cm with attack intensity of lac insect ± 30% and 3 potential branches to be infested.

9. Kaliandra(*Calliandra calothyrsus*)**:** this plant was also found near kesambi and potential to be infested by lac insect and formed thick lac. When this observation was conducted no contagion was found (this information was told by lac farmer).

10. Lengkukun: these plants were also wild plants around kesambi. A white layer contagion was found on the branches with contagion length 1 cm with branch diameter less than 1 cm. Attack intensity of lac insect was ±30%.

11. Kentawong: this plants were wild plants around kesambi and potential to be infested by lac insect. Contagion length was about 10 cm with branch diameter less than 1cm. The main stem diameter can reach > 10 cm, but the weakness of these plants was fast drying. Because of this, lac was never formed. Lac is usually harvested ± 5 months after infested by lac insect.

12. Ara(*Ficus carica*)**:** there were enough ara plants found in Penjaruman and Darakunci region. This plants have been infested by lac farmer and capable of lac

formation as good as kesambi, but this activity was stopped because kesambi forest still exist.

In this inventories besides potential plants to be infested by lac insect, there were also found several plants that could not be infested by lac insect although they grew near kesambi. Those plants were lamtoro, orange, jack fruit, nimba, cashew nut, singapur, and krerongan. Kaushik *et al*. (2012) stated that lac insect will die on non-host plants because plants are too soft or too hard. On moderate host plants, lac formation is imperfect and dried

Based on the last observation, capability of inventories plants was varied in lac formation. Kaliandra, sonokeling, and ara plants produced lac high enough the same as kesambi. Kesambi as a host plant of lac insect can produce about 35-40 kg/plant, attack intensity of lac insect 100%, contagion length 40-60 cm with branch diameter 1-2 cm, and contagion fullness 50-75%. Kaliandra, sonokeling, and ara plants produced lac the same as kesambi (based on lac farmer information who infested those plants on purpose), so that they were potential to be developed as alternative hosts other than kesambi. This was supported by small sonokeling plant about 75 cm in height near kesambi infested by lac insect and capable of forming a thick lac. Attack intensity of lac insect in this small sonokeling plant almost 100% with contagion length ± 60 cm and already formed lac about 20 cm, branch diameter ± 1 cm. The lac farmers still dont develop those 3 plants because kesambi forest still exist.

Mangga plant was capable of producing lac but the quantity was lack ± 25 g/plant, attack intensity of lac insect about 6%, contagion length 5-10 cm with branch diameter 1-2 cm, and contagion fullness 10-15%. Lac quality was poor because of somewhat dry and unsmooth. Lac produced by sengon plant was better in quantity and quality than that of mangga plant. Lac production about 75 g/plant, attack intensity of lac insect about 10%, contagion length 15-40 cm with branch diameter 1-2 cm, and contagion fullness 20-30%. Sengon plant is better to be developed as alternative host plant than mangga plant.

Langgem and boran were wild plants around kesambi that they had been infected by lac insect and capable of producing lac. Boran plants were plants creeping up the kesambi plant with stem length more than 2 m. Boran plants were

plenty enough around kesambi. Langgem plants were woody wild plants with stem and branches thorny. These plants were also plenty enough around kesambi.

For langgem plant, attack intensity of lac insect was 15-20%, contagion length about 10 cm with branch diameter ± 1 cm, and contagion fullness about 20%. For boran plant, attack intensity of lac insect was 20-25%, contagion length about 70 cm with branch diameter ± 1 cm. Both plants were potential to be developed as alternative host of lac insect.

Conclusions

1. There were 12 plants both annual and wild plants around kesambi were potential to be the alternative hosts for lac insect. Those several plants were mangga (*Mangifera indica*), sengon (*Albizia chinensis*), sonokling (*Dalbergia latifolia*), kaliandra (*Calliandra calothyrsus*), ara (*Ficus carica*), langgem (*Caesalpinia decapetala*), boran (*Pueraria montana*), tempulat (*Arctium minus*), telean/tembelek (*Lantana camara*), kesembung, lengkukun, and kentawong.
2. Among them only *Mangifera indica, Albizia chinensis, Dalbergia latifolia, Calliandra calothyrsus, Ficus carica, Caesalpinia decapetala,* and *Pueraria montana* could produced lac.
3. *Calliandra calothyrsus, Dalbergia latifolia,* and *Ficus carica* produced lac equally like kesambi both in quantity and quality.
4. *Albizia chinensis* produced lac higher than *Mangifera indica* both in quantity and quality.

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