Sexava Nubila Behavioral Analysis In Every Changes Of Imitation Sound From Level Of Intensity

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Abstract

Sexava Nubila is a native Indonesian insect who live in Eastern part of Indonesia, particularly in areas of Talaud Islands in North Sulawesi and a coconut pests that harm farmers so that needs to be eradicated, the insect to be an insect pest is a young insect (nymphs). *Sexava Nubila* while doing activities such as mating using sound to the opposite sex and they are active at night, the insect which emit sound is male and the female no wheezes. These insects are active at night starting at 18.00 until 05.00, for male insects produce sounds up both wings to with intensity levels ranging from 50-70 dB in the measurement results using a sound level meter and recorded using VOICE RECORDER. Nubila sexava sound is modified into a tool that can be applied to sound nubila sexava to see how the behavior of females after listening to the sound of this modification.

Keywords: aids sound, *Sexava Nubila,* intensity

1. Introduction

Sexava Nubila is a type of locust destroyer coconut plants, included in the family Tettigonidae ordo Orthoptera. *Sexava Nubila* be in many islands, Kei, Aru, Talaud, Nanusa, Seram Island and Papua Bacan, long *Sexava Nubila* females from 9.5 to 10.5 cm, while the males 9 to 9.5 cm, length of ovipositor 3.2 to 4 , 5 cm. *Sexava Nubila* families included in the ordo Orthoptera Tettigonidae. This insect group known as the grasshopper long tentacle, his trademark is a long, flat antennae that resemble blades, as well as the tympanum located on the front of the base.

When laying, the female mantis flew down. No eggs are laid in the ground as deep as 1-5 cm, between the roots at the base of the stem, in the wood was rotten, above ground, in the stem of the plants, or branches and leaves of the fibrous sheath. Egg shape resembling grains of the existing gap. Egg kind of its length 10-12 mm. The number of eggs approximately 58 grains, eggs initially very flat, but the eggs swell after the embryo develops. After the 50 day old eggs, nymphs hatch in the evening at around 7:00 p.m. to 9:00 p.m.. nymphs then walked to the top of the tree the place where they hatched, nymphs about 13 mm long with long antennae 8-9 cm. Nymphs consuming coconut leaves, bark, nut, sago, pandanus, bananas and cardamom sabrang, sometimes nymphs eat nuts, cloves and mangosteen, but the leaves are eaten to be very rude. Palm trees that originally eaten usually older leaves, then the young leaves, but occasionally eat flowers nymphs (Virgin) and young coconut *S. nubila* nymph period around 70 days.

Figure 1. Nimfa Sexava nubile

Figure 2. Palm leaves that were damaged by Nimfa Sexava nubile

II. Equipment and Materials
A. Sound analysis in the field
To determine the level of sound intensity in the field using nubila sexava Sound Levelmeter NM-3 NORIS models made in Japan, while for the sound recording that will be applied to a tool using Voice Recorder Model No.. W900 made in Korea.

B. Tool-making.
Sexava Nubila sound tools.
This tool is made the center of Surabaya Tile Electronic Markets. The tools used are: (1). for the amplifier circuit using 2 capacitors, 470 nF, and 100 μF, 3 pieces each resistor 560 kΩ, 470 kΩ and 2.2 kΩ, a single transistor C828 NPN type, (2). to use the tone control circuit 5 pieces each resistor 1 kΩ, 8.2 kΩ, 2.2 kΩ, 3.3 kΩ, 5 capacitors and potentiometers and 1 piece (3). final amplifier consisting of an NPN transistor 1 fruit type 828, 1 resistor and 2 capacitors. This tool has been created in the laboratory and applied in habitat *Sexava Nubila* to see the behavior occurs.
C. Behavior analysis in the laboratory
Make a cage with the size, length 300 cm, width 30 cm, and 60 cm Cleaner, made into 10 plots with size 30 cm x 30 cm x 30 cm, then every cage placed one tail *S. nubila*. The first step cages placed *S. nubila* male then heard the sound made starting at a distance of 1 m to 5 m and then observe the behavior of all *S. nubila*, it turns out that all *S. nubila* males did not react after hearing sounds ranging from 50 to 80 dB. The next step *S. nubila* males issued later replaced by *S. nubila* females and played sounds like the treatment of *S. nubila* male turns out that all *S. nubila* females interact with each change of sound intensity level.
1. The sound production on *Sexava Nubila*
Insect sounds generated using a diverse mechanisms, such as those generated from wing vibrations in flight and may occur sporadically and do not have a specific value for the insects, but usually they have some real meaning and special mechanisms established for the production of their sound. Many examples of the sound produced by the movement of the top row of serrations on the lines at a number of other parts of the body that can vibrate. Dragging mechanism so famous on Orhtoptera Ordo, Coleoptera ordo and several of Homoptera ordo and Lepidoptera ordo, the membrane that vibrates by working directly cause a muscle (Chapman, 1971).

Sounds that have meaning in higher intra specific organized consisting of one sound exploded repeatedly in an orderly way. Some insects have a number of different songs and sounds characterized by having different intervals and are usually used for different situations. Intraspecific sounds commonly used in marriage, but can also in sexual, social groupings and on insects, other behaviors are only used for communication (Chapman, 1971).
Insects produce sound only under special circumstances surrounding, this situation may be regulated by hormones. In certain circumstances, the production of sound (noise) under the control of the central nerves in the brain coordinate sensory input and provide cues to centers ganglia resulting singing (sounds) are suitable.
2. These sounds mechanisms and the resulting
The resulting sound of insects can be defined as mechanical disruption and potentially carried by insects to an external source and a limited (Pumphrey, 1940). The sound is not only propagate through the air and fluid, but also can be propagated through the substratum / solid (Broughton, 1963). Cricket can produce several series of

pulses, and can be defined as a series of waves of different sounds. Each pulse produced by a single vibration stridulasi swiping motion and thus produce a series of pulses. pulse sequence is repeated regularly called one phrase. *Sexava Nubila* to produce sound by raising both wings as she rubbed the back.

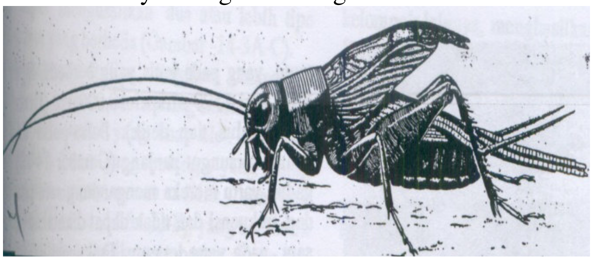

Figure 3. Sound mechanism produced by *Sexava Nubila*

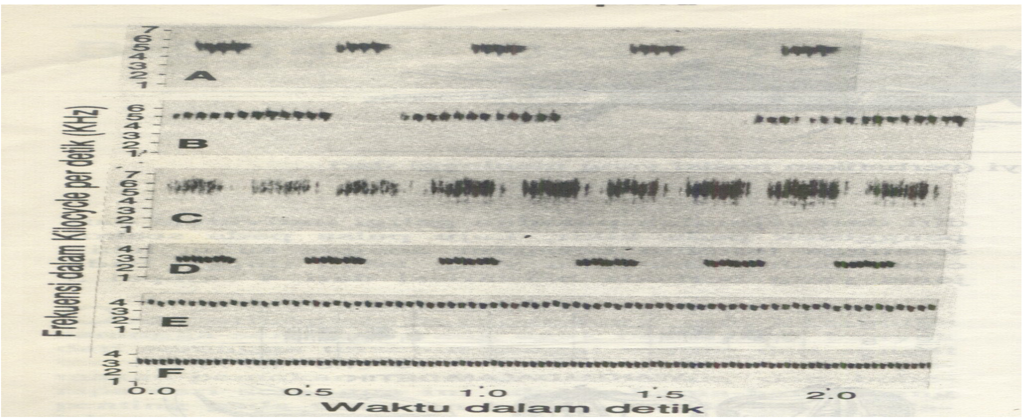

Figure 4. Audiospektoraf of sounds *Sexava Nubila*:

a. d, e, and f. calling chants
b. aggressive chants
c. Song of seduction marriage.

3. Sound Design Build Tools *Sexava Nubila*

Sounds literally can be defined as something that we hear, is the result of vibration of the particles in the air (Sound Research Laboratories Ltd, 1976), and the energy contained in sound can rise rapidly and can travel a great distance (Egan, 1972). Before designing tools, then first of all the original sound recording of *Sexava Nubila* field, then made tools. The shape of the spectrum and the sound signal can be seen in Figure 5 and Figure 6.

4. Sound spectrum insect

Sexava Nubila sound recording spectra can be seen in Figure 5 and the signal shape can be seen in Figure 6. These results using software adobe audition by looking spectral view of the speech signal.

Figure 5. Sound spectrum *Sexava Nubila* on tape

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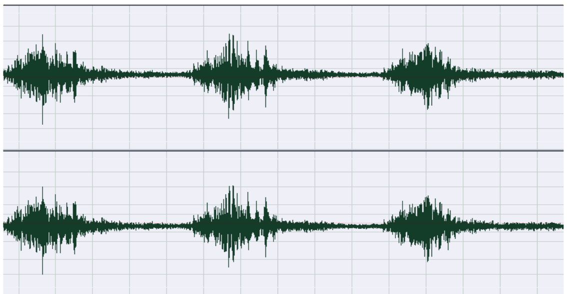


Figure 6. Form of sound signals are analyzed

Dominant frequency content analyzed using frequency analysis in the program menu adobe audition. Obtained from the analysis of the character of the frequency of the highest frequency sounds of insects and issued by insects. From the picture above shows that the dominant noise signals at a frequency of about 7 kHz, and turns on when there are insects that approached the tape recorder.

5. Beep-making tool *Sexava Nubila*

The recordings that have been recorded *Sexava Nubila*, then applied in the form of equipment where the level of intensity can be varied according to the level of intensity of the sound produced *Sexava Nubila* original. Form made the instrument as shown in Figure 7 and Figure 8.

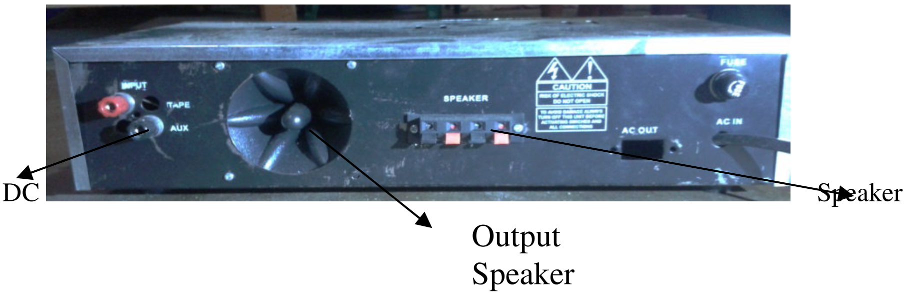
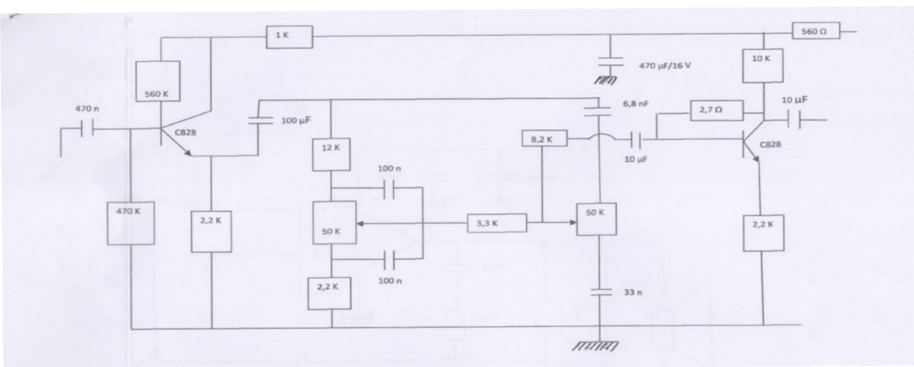


Figure 7. Physical Form Tools Beep *Sexava Nubila*

The circuit schematics Tools

Figure 8. Block Diagram of Series of Tool



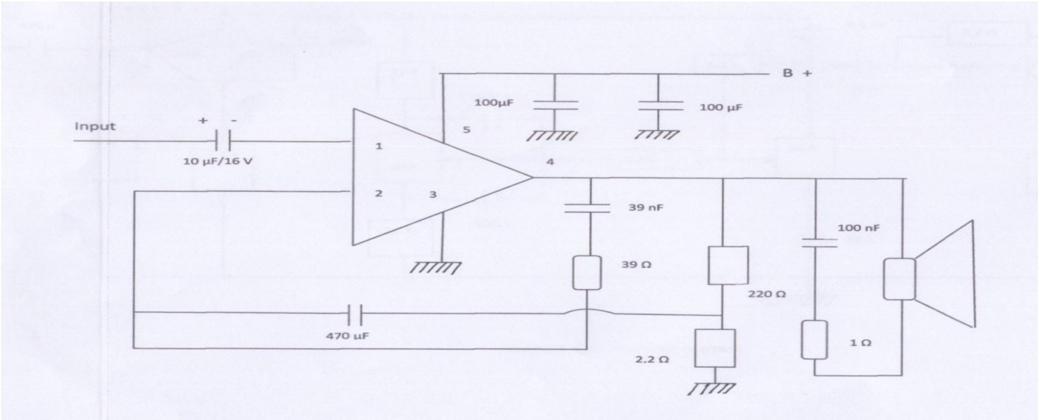
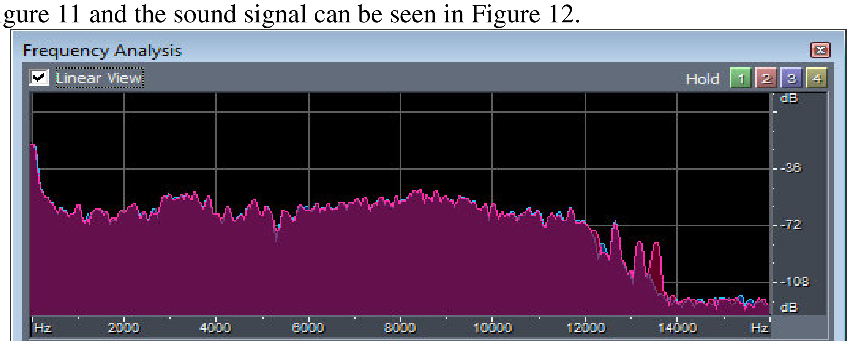


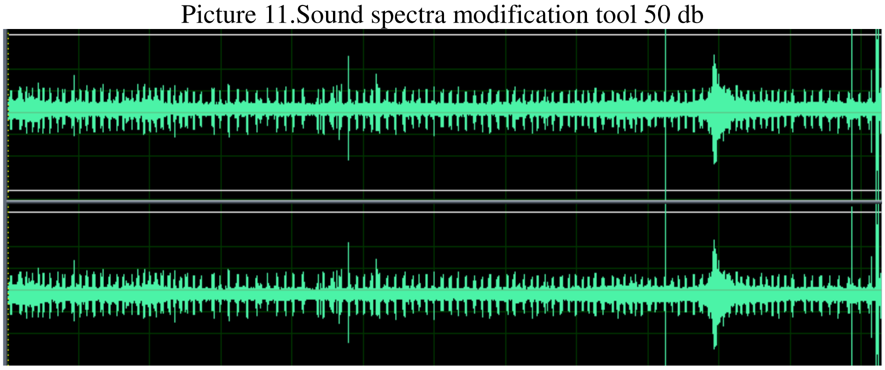
Figure 10. Power series

III. Results and Discussion

Sexava Nubila recorded sound was later modified into a tool where the intensity level may be changed at the will start from the original level of sound intensity *S. nubila* 50 dB to 120 dB. Spectrum of sound modification tools can be seen in Figure 11 and the sound signal can be seen in Figure 12.



Picture 11.Sound spectra modification tool 50 db



Picture 12. Sound signals *Sexava Nubila* modified 50 dB

In figure 10 shows the results of this modification to the structure of the singing waves of *Sexava Nubila* calls according to *S. nubila* original in nature.

Table 1. *S.nubila* percentage Approaching Sound Source

Intensity sound level (db)	Percentage (%)				
	1 m	2 m	3 m	4 m	5 m
40	16.5	8.5	5.0	5.0	0.0
50	35.0	18.5	8.5	5.0	5.0
60	85.0	75.0	60.0	50.0	42.5
70	85.0	83.5	75.0	68.5	58.5
80	73.5	71.5	75.0	78.5	70.0

Table 1 above shows that the highest percentage of female insects approach the source of the sound intensity level is 60 dB and 70 dB for a distance of 1 m is located at the intensity level of 60 dB, while for a distance of

2 m is the intensity level of 70 dB with a percentage value of 85.0%

Based on the results of data processing, obtained the average value and standard deviation at each level of each factor (there are five levels in the distance and the average value of deviation standart) in each combination on both factor . Table 2 shows the highest average for many *S. nubila* in 1 metre high, 3,40+ 0,94 insects and the lowest is in 5 Metres high that is 2,45 + 1,30 insects.

Table 2. The average insects who approaching the source of the tool sound

Distance (m)	*S. nubila* approaching sound source (tail)
1,0	3,40 ± 0.94
2,0	3.09 ± 1.15
3,0	2.82 ± 1.26
4,0	2.69 ± 1.27
5,0	2.45 ± 1.30

Table 3. Average *S. nubila* is Approaching Sound Source Based on Sound Intensity Levels.

Sound intensity level (dB)	*S. nubila* approaching (tail)
40.0	1.31 ± 0.43
50.0	1.73 ± 0.61
60.0	3.58 ± 0.49
70.0	3.91 ± 0.29
80.0	3.90 ± 0.12

Table 3 shows that the highest average number of *S.nubila* there was the sound of 70 dB, which is 3.9 ± 0.29 tail, while the lowest at 40 dB sound, ie, 1.31 ± 0.43 tail

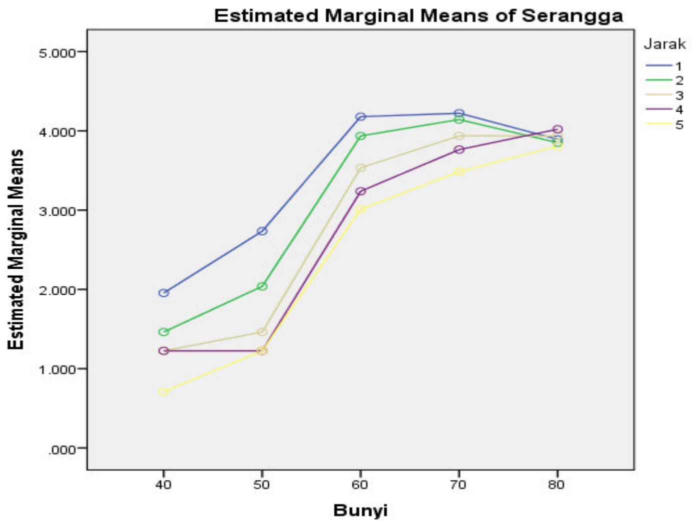
Table 4. Average *S. nubila* Approaching Sound Source Based on Distance and Sound Intensity Level

Distance (m)	Sound Intensity Level (dB)				
	40	50	60	70	80
1,0	1,95 ± 0,14 d	2,73 ± 0,18 c	4,18 ± 0,24 d	4,22 ± 0,07 d	3,89 ± 0,15 ab
2,0	1,46 ± 0,21 c	2,04 ± 0,14 b	3,94 ± 0,13 cd	4,14 ± 0,07 d	3,85 ± 0,07 ab
3,0	1,22 ± 0,00 b	1,46 ± 0,21 a	3,53 ± 0,14 bc	3,94 ± 0,00 c	3,94 ± 0,13 ab
4,0	1,22 ± 0,00 b	1,22 ± 0,00 a	3,24 ± 0,15 ab	3,76 ± 0,08 b	4,02 ± 0,07 b
5,0	0,71 ± 0,00 a	1,22 ± 0,00 a	3,01 ± 0,40 a	3,48 ± 0,16 a	3,81 ± 0,13 a

Specification Table 4:
Average number followed by the same letter are not significantly different states between the distance and the sound intensity level (p> 0,05). Average figures followed by the same letter are not significantly different states between distance and sound intensity levels (p <0.05)

Table 4 shows that

1. The highest average number of *S. nubila* at a distance of 1 m was there at the sound of 70 dB, which is 4.22 ± 0.07 insects, while the lowest at 40 dB sound, ie, 1.95 ± 0.14 insects
2. The highest average number of *S. nubila* at a distance of 2 m was there at the sound of 70 dB, which is 4.14 ± 0.07 insects, while the lowest at 40 dB sound, ie, 1.46 ± 0.21 insects
3. The highest average number of *S. nubila* at a distance of 3 m was there at the sound of 70 dB and 80 dB, ie, 3.94 ± 0.00 insects, while the lowest at 40 dB sound, ie, 1.22 ± 0.00 insects
4. The highest average number of *S. nubila* at a distance of 4 m was there at the sound of 80 dB, which is 4.02 ± 0.07 insects, while the lowest in the sound of 40 dB and 50 dB, ie, 1.22 ± 0.00 insects.
5. The highest average number of *S. nubila* at a distance of 5 m was there at the sound of 80 dB, which is 3.81 ± 0.13 insects, while the lowest at 40 dB sound, ie, 0.71 ± 0.00 insects.
6. The analysis showed that most behavior is not meaningful at a distance of 3 m and 4 m with a sound intensity level of 40 dB and a very significant that at a distance of 4 m and 5 m with sound intensity level. The analysis showed that most behavior is not meaningful at a distance of 3 m and 4 m with a sound intensity level of 40 dB and a very significant that at a distance of 4 m and 5 m with a sound intensity level of 50 dB



Picture 13. The influence of interactions towards the number of insects according to the sound factor

IV. conclusion

All forms of sound or noise, including the sound of *Sexava Nubila* can be converted into a tool which can change the intensity level changed in accordance with the wishes and the exposure time can sound 1 x 24 hours without stopping. These tools use either electrical energy from the source of electricity or batteries. The observation turns out that this tool can be used as a controller *Sexava Nubila* the coconut pest Talaud Islands in North Sulawesi, which resulted in decreased oil production.

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