Application of Foul Odor (Smell Bad) of Carcass as A Mechanism for Controlling *Leptocorisa acuta*, A Sucking Insect Pests of Rice Plants: Evidence from Indonesia

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Abstract

The surface of the earth is indeed as residence of all various of living things where 50.8 of all living things occupying the earth are insects with the largest insect percentage being of 72% (Daly *et al*., 1978). Insects, as the largest percentage of organisms of all li-ving things inhabiting the earth, are very varied organisms and also as the occupants of earth surface with a percentage of 80% of their own phylum (Sunjaya, 1994; Christian & Gotisberger, 2000). Insects as a plants green-eating invetebrate organisms and also as one of the most widespred organisms that can be found in a variety of habitats (Borror, Triphelorn & Johnson, 1992), do not live in *vaccum* state and *space* in an ecosystem but basically live in interacting with other organisms and coexist in a contemporary way (Pianka, 1978). Insects as one of green plants-eating invertebrates are categorized as beneficial insects species including predator, pollinators, parasitoids and detrimental insects species (Christian & Gotisberger, 2000) in term of categorical aspect of status coexisting in a contemporary way.

This research was conducted in June 2022 when insect pests of rice plants began to appear using a simple complete randomized design.There are three type The baits used to catch insect pests destroying rice plants are: Fish Snats, Sardines and Snail Meat, where each type of bait is hung on 7 bottles of medium aqua. Bait bottles containing the type of bait depending on each aqua bottle were stuck in each cage with an area of 7 areas.

Data on the results of calculating the average number of individuals caught from 7 bottles of traps each containing trap ingredients in the form of fish gills, dried fish meat, sardines (*Sardilla longiceps*), land snails for 5 days at each observation time (08.00-10.00; 12.00-14.00; 15.00-18.00) At 08.00-10.00 am the average number of catches *Leptocorisa acuta* on the catch bottle containing fish meat sardines dry (*S.longiceps*) experienced a sharp reduction from the average number of 28,285 on the first day to 8,714 on the fifth day (first day vs fifth day; 19,571; day I vs day II of 2,857 individuals; day I vs day III of 10 individuals; day I vs day IV of 15,571). The average number of individuals caught on bottles containing dried sardine meat (*S. longiceps*) on day I was 27,571, on day II 21,428, day III was 23,571, day IV was 25,571 while day V was 22,714. Average number of individuals caught in the bottle containing the snails *(Gastropods)* day I 11.85, day II 19.714, day III 8.857, day IV 6.142 while day V 16.142

Keywords* : *Insect, Leptocorisa acuta

INTRODUCTION

The surface of the earth is indeed as residence of all various of living things where 50.8 of all living things occupying the earth are insects with the largest insect percentage being of 72% (Daly *et al*., 1978). Insects, as the largest percentage of organisms of all li-ving things inhabiting the earth, are very varied organisms and also as the occupants of earth surface with a percentage of 80% of their own phylum (Sunjaya, 1994; Christian & Gotisberger, 2000). Insects as a plants green-eating invetebrate organisms and also as one of the most widespred organisms that can be found in a variety of habitats (Borror, Triphelorn & Johnson, 1992), do not live in *vaccum* state and *space* in an ecosystem but basically live in interacting with other organisms and coexist in a contemporary way (Pianka, 1978). Insects as one of green plants-eating invertebrates are categorized as beneficial insects species including predator, pollinators, parasitoids and detrimental insects species (Christian & Gotisberger, 2000) in term of categorical aspect of status coexisting in a contemporary way.

One of the detrimental insects species that capable of causing severe damage to crop yields especially if the population reaches high density for rice farming com-munities is a rice plant pest insects. Insect pests cause damage externally by sucking sap or liquid or cell contents in the vascular system of rice plants or by sucking liquid from rice seeds in a mature state of milk (keadaan masak susu) or internally by bo-ring into the plants tissue (Daly *et al*., 1978; Pracaya, 2007; Ruswandi *et al*., 2007). The consequence of the mechanism of the destruction of the rice plants by insect pests is that the plant leaves turn yellow and dry up quikly and expand (hopperburn) and the grain becomes empty and bleached (puso). Observation on land already planted with rice in March and April 2019 in Kamanasa and Kada showed that approximately 8 large plots of rice fields experienced planthopper fires (Hopperburn) and the others experienced puso. The loss suffered by the owner of the rice fields due to these two phenomena are estimated almost 3 tonnes of grain or up to 9 million rupiah (@ kg of grain equal to Rp. 3, 000 or 26, 100, 000 rupiah (@ kg of grain equal to Rp. 9000.

The damage on either trunks, foliages or grains of attcked paddies actually did not occuered due to the existance of alkaloids, flavonoids, terpentens,lignin, tannins, as wel as saponines as defendence system within those organs (Howe & Westley, 1988). Alkaloid as one nitrogen-containing heterocyclic molecule that is principle to be thought as chemical defense of plants (Howe & Westley, 1988, Buchanan, Gruissem & Jones, 2000) and aslso as a complex amine or molecule which physiologically active amine ((Holum, 1991). Alkaloid as the chemical defense of plants and also as a basic compound obtained from a plant (Bettelheim & March, 1991) or as a compound which protects plants againts insects and herbivorers (McKee & McKee, 2003) can serve function of blocking the enzyme acetylcholinesterase at the nerve synapses (Howe & Westley, 1988) and can play also the function of feeding deterrant (Buchanan, Gruissem & Jones, 2000). Lignin inter-fere with digestion by binding to both carbohydrate substrtates and digestive enzymes in the animal gut whereas tannin particularly condensed tannin impede animal digestion of plant tissues by (1) blocking the action of digestive enzymes, (2) binding to proteins being digested, or (3)

interfering with protein activity in the gut wall (Van Soest, 1982) and as a molecule inhibiting larva's moulting causing lethality to larva before getting to pupae.

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Taek's research results (2020) indicated that brown leafhoppers (*Nilaparvata lugens* Stal), green leafhoppers (*Nephotetix virescens*, Distant), and stink bugs (*Lepto-corisa acuta*, Thunb) were the insect pests that were most responsible for the decrea-sing crops productivity. The amount of reduction in harvest per each harvest period dependents on the number of pest insect species and as well as the population size of each devastator insect species in the rice field ecosystem. The more devastator pest insect species and the greater the devastator pest insect population, the greater the de-crease in crop yields. The reduction of harvests appreciably account for farmers to de-press three insect pest devastator populations by chemical controll as an effective and an efficient controlling. Chemical control is indeed very effective and efficient becau-se it immediately reduces both the number of species and the population of insect pest but on the other hand it accounts for (1) the death of the predators, parasitoids as the non target organisms performing function as natural enemies coexisting in contempo-rary way, (2) also resurgence and resistant of insect pests, (3) lethality and residual effect upon environment, (4) oral toxicity, dermal toxicity and also inhalation toxicity upon applicants during preparation and application of chemical control (Bala, 1999).

Due to the four negative impacts of chemical control, the capture and desuct-ion of devastator pests is carried out, as an environmentally friendly control using rotting carcasses, to reduce only the number of species and the population of devas-tator pests. Rotting carcasses used are internal organ of the fish (gills and intestines), land snail meat, the dried sardine meat (*Sardinella longiceps*), The selection of a foul odor is based solely on the nature of insects which usually and always aggregates in places emiting foul odors from carcasses or aromas of sex attractant pheromone. The foul odors felt is essentially the smell produced by putrescine (1,4-diamine buta-ne or butanediamine or according to Dorland, 2007 is tetra-methileine-di amina) and kadaverine (1,5-pentanediamine or pentametilenediamine) as a result of the dismantling of amino acids by bacteria on the carcass. Putriscene merupakan senyawa hasil dekarboksilasi ornithin dan sebagai prekursor spermidin. The dismelting of the carcass depends also on the activity of enzymes. The higher the temperature the lower the enzyme activity and ultimately the performance of its function does not to occur. The main purpose of this research is to learn and determine the effectiveness of the stench as an attractant againts insect pest devastating rice plants.

METHOD

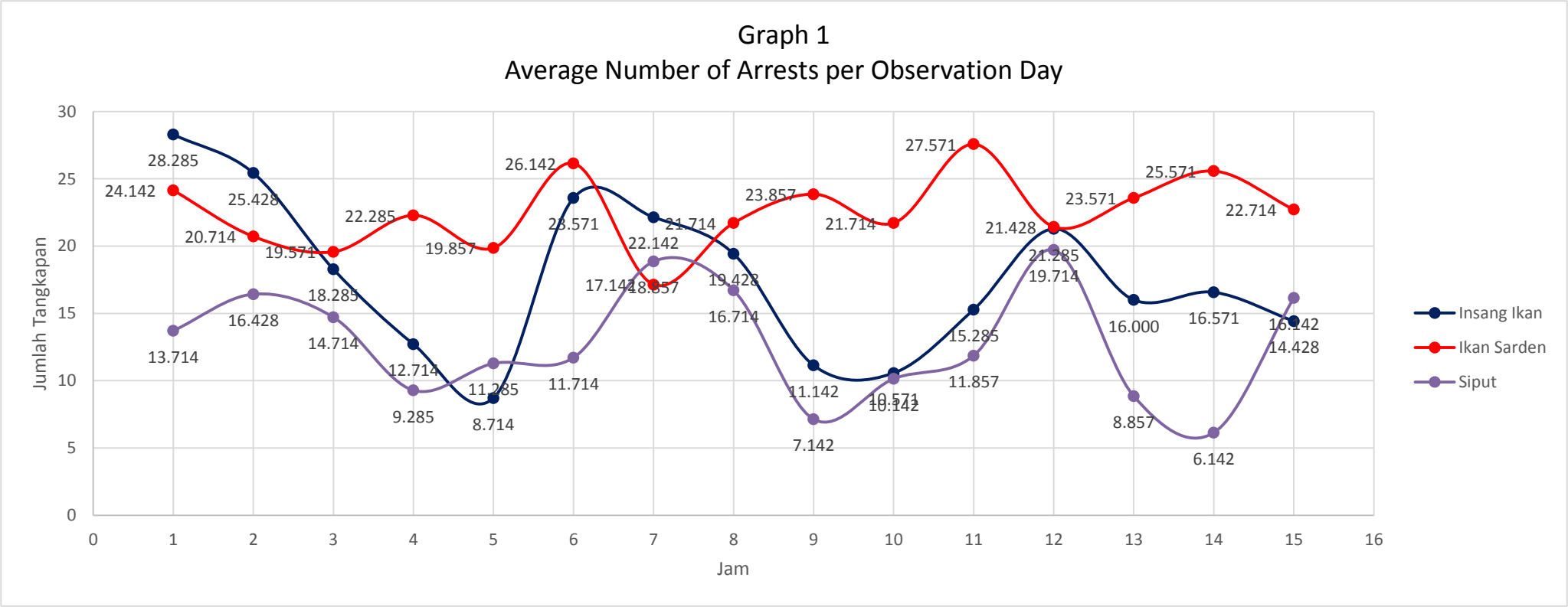
This research was conducted in June 2022 when insect pests of rice plants began to appear using a Simple Completely Randomized Design. JThe types of bait used to catch insect pests destroying rice plants are: Fish gills, Sardine meat and Snail Meat (land snails), where each type of bait is hung on 7 medium aqua bottles. Bait bottles containing the type of bait depending on each aqua bottle were stuck on each 30 meter long wooden stake in a 3 acre planting area. Data collection was carried out in three time categories, namely 08.00-10.00 am, 12.00-14.00 pm and 15.00-17.00 pm. Chosen and stipulated hours of this arrest with the assumption that the hotter the lower the resulting decomposition denaturation as a direct result of high temperatures caused by the sun's heat. Each sample bottle of the three types of simple random bait was taken every 10.00, 14.00 and 17.00 for five days to determine the number of traps and then reassembled in the same place. The total catch for five days was analyzed descriptively to determine and decide which of the three species would be used most effectively as eco-friendly controls.

RESEARCH RESULT

Data from the calculation of the average number of individuals caught from 7 bottles of traps, each containing ingredients in the form of fish gills, dried fish meat, sardine (Sardinella longiceps) meat, land snail meat for 5 days at each time of observation (08.00-10.00; 12.00-14.00; 15.00-18.00) as outlined in the table which is then expressed through the graph below. The data disclosed in this graph shows that actually the three types of odorous attractants have great potential asattractant of Leptocoris *sharp.*From the graph it is known that the average number of catches for five days at 08.00-10.00 is as follows. 08.00-10.00 average number of results leptocoris catch *sharp* on a catch bottle containing dried sardine meat (*S. longicep*) experienced a sharp decrease from the average number of 28,285 on the first day to 8,714 on the fifth day (first day vs fifth day; 19,571; day I vs day II of 2,857 individuals; day I vs day III of 10 individuals; day I vs day IV 15,571). The average value of catches in bottles containing fish gill lures decreased from the second to the third day, then increased again on the fourth day and decreased again on the fifth day. The magnitude of the decrease on the second and third days was respectively 3,428 (day I vs day II) and 4,571 (day I vs day III). Enhancement Amount average value from day IV to day V is 2,714. The average number of individuals in the snail meat catching vials actually increased from day I to II as many as 2,714 individuals then decreased again on days III and IV respectively by 1,714 (average individual day II vs day III) and 5,429 individuals (average individual average day II vs day IV) then increased again on day V to 11,285. The magnitude of the increase from the average number of days IV to day V is 2.00 birds.

The average number of individuals. *acute on* The type of fish gill bait in bottle traps at 12-14 hours for five days also experienced a sharp decrease from day II to day V. A sharp decrease occurred on days IV and V with a decrease of 17,429 (day I vs day IV) and 18,000 (day day I vs day V).The average number of individuals *L. acute* bottle filled with dry sardine bait (*S.longisep*) decreased on day II by 7,285 animals then increased again on day III by 2,857 animals and on day IV by 2,143 animals. Then there was another decrease on the V day

of 2,709 animals. The average number of individuals caught as a result of attracting land snails on day II increased by 5,428 to 17,142 individuals from 11,714 individuals (day I) but the average value on day III decreased sharply on days IV and V each by 9,599 individuals (day III vs IV) and 6,599 individuals (day III vs day IV). The magnitude of the average value of the individual*L. acute* catch at 15.00-17.00 as follows. The average number of individuals caught in bottles containing dried sardines (*S.longisep*) day I 27,571, day II 21,428, day III 23,571, day IV 25,571 while day V 22,714. On day II there was an average decrease in the number of individuals by 6,143 while on days III and IV there was an increase in the average individual quantity of 2,143 (day II vs day III) and 4,143 (day II vs day IV) while on day V there was a decrease of 2,857 (day IV vs day V) or a decrease of 4,857 (day I vs day V). The average number of individuals caught in a bottle with snails*(Gastropods)* day I 11.85, day II 19.714, day III 8.857, day IV 6.142 while day V 16.142 (day II Vs day III) 10,857 and on day V there was an increase in the number of individuals by 1,143 (day I Vs day V) 4,292


Graph 1
Average Number of Arrests per Observation Day
Jumlah Tangkapan
Jam
Insang Ikan
Ikan Sarden
Siput
28.285
25.428
18.285
12.714
8.714
11.285
23.571
21.714
19.428
11.142
10.571
15.285
21.428
16.000
16.571
16.142
24.142
20.714
19.571
22.285
19.857
26.142
17.142
23.857
21.714
27.571
23.571
25.571
22.714
13.714
16.428
14.714
9.285
11.714
22.142
16.714
7.142
10.142
11.857
21.285
19.714
8.857
6.142
14.428

DISCUSSION

The research results that have been obtained and presented through this graph indicate that none of the bait used (fish gills, sardine fish meat (*Sardinella longiceps*) and land snail meat that does not attract individuals *Leptocorisa acuta* in the rice field area to catch bottles. Must be individuals*L. acute* can only stay in a collection bottle at 08.00-10.00 am and 15.00-17.00 until 18.00 hours as stated in the graph of the research results. This kind of thing is really closely connected with feeding *activity of almost* all insects including *L. acute* i.e. in the morning and evening. This is because in the morning and evening the ambient temperature is relatively low where at such an ambient temperature acute does not lose excessive body water content instead encourages these organisms to go out to places that contain food ingredients cq to overgrown rice fields plant paddy (*Oryza sativa*). During the day, 12.00-14.00 is also still there*acute* the trapped devastator that those individuals should have escaped from the trap. Escaped because the organism is no longer around because it has flown to a shelter where it is sheltered to avoid excessive heat as well as to suppress the loss of body water content so that death does not occur due to desiccation of the body which is in line with the thoughts stated in Gibbs (1999).

Any insects including *L.acute* Devastator, even if it is far away from the favorite energy source plants, still knows where the energy source plants are and will always move there. The movement of insects is directed and pulled by the emission of kairomone which is a chemical substance produced by a kind of living creature and attracts the recipient to get closer to the emitter (Rockstein, 1982; Price, 1987) and this kairomone is at the same time behavior-controlling *chemical* (Wage & Greathead, 1986). Tanaman padi (*Oryza sativa*) as living things also produce kairomone which is a volatile gas so cute The devastator who receives it will move towards the rice plants to then suck up the liquid from the seeds of the rice plants which are undergoing a milk-cooking phase. Field facts such as those manifested Through this graph, there is actually a very close relationship with the stench emitted by and from the three types of bait used. The stench that was emitted was onin principle physiologically produced by putrescine (1,4-diamine butanediamine or according to Dorland, 2007 is tetra-methylene-of amine) and cadaverine (1,5-pentanediamine or pentamethylenediamine) as a result of the dismantling of amino by bacteria on the carcass of these three types of bait. The stench of putrescine results and cadaverine which is emitted on the fact it acts as a kairomon that attracts and excites the recipient moves towards the place where the stench is produced, namely into the bottles containing the three types of bait.

Based on the catch data expressed through this graph it can be said that it turns out to be an activity enzyme and the decomposing bacteria in these three types of bait continue even on hot days. The consequence is still produced of putrescine and of a cadaver as the source of the stench. This kind of condition lasted for observation (day I to the last day; day V). As a result, these insects still move towards the trap bottles so that the individuals are still trapped during the trapping. The number of catches indicated by the average number of catches was

indeed lower for bottles containing land snail meat, especially on the last day. This low average number is due to the low emission of foul odors due to the low production of putrescine and cadaverine from land snail meat tissue that has begun to dry out not only on the outside surface but also on the inside. The dryness of this tissue no longer produces a stinging stench when smelled, so it no longer has the potential to stimulate *L. acute* to get to the bottle. The mean value of the number of individuals caught using fish gills and dried sardine meat (*sardinella longiceps*) from the first to the last day was still due to the impact of the rotten smell from the putrescine and cadaverine. Apparently because the second day to the last day of putrescine and foul smell emission results cadaverine of bacterial activity still continues even though the temperature is high. It is this foul odor emission that keeps attracting these devastator insects. High temperatures are in line with the heat of the sun during the day starting from 12.00 without pressing production putrescine and cadaverine through restriction or reduction of either enzymatic activity and the activity of decomposing bacteria in it. In fact, the high temperature actually helps spread the emission of foul odors as one of the kairomones by diffusion to distant inhabited places so as to make these rice seed liquid sucking organisms closer to the bottles containing the baits.

CONCLUSION

Based on the large average number of catches during the 5 days of observation, it was concluded that the three types of bait were used to catch *L. acute* as a herbivorous insect this devastator is just as effective so it can be applied to control the number of individuals acute in the paddy field.

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