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THE LANDING PERIODICITY OF *Stomoxys calcitrans* IN RATIONS, SUPPLEMENTED WITH CITRONELLA AND PAPAIN ON BROILER HEALTH

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Abstract

The quality of broiler rations really affect the nutrient intake to be digested and metabolized in the animal body, but the presence of *Stomoxys calcitrans* potentially could disturb the health of many livestock. Interest of flies on the rations material is to be used as a food source and location for oviposition. The use of bio-repellent citronella and papain in this research aims to reduce the number of flies that do Landing Periodicity on a scale of morning-noon period-afternoon to avoid the risk of microbe pathogenic transmission by this flies. The results showed a trend in the level of citronella and papain c2p2 taken a role in suppressing the landing of the flies. Moreover during the study, we did not find any disease in chicken therefore the mortality rate was 0%.

Key words: broiler, *Stomoxys calcitrans*, citronella, papain, landing periodicity, mortality

INTRODUCTION

When a *Stomoxys calcitrans* came for landing on the material of rations these type of fly could distribute pathogenic germs or microbes on it, consequently the quality can be reduced. Therefore, it is very essential to control the presence of *Stomoxys calcitrans* on broiler rations. It is important to avoid the transmission of pathogenic microorganisms; if not then various biological agents will be deployed by the insects. Some anatomical parts are used to perform the activities of flies for landing and simultaneously to transfer the pathogenic agent into the rations. The anatomical sites are as well as, proboscis, legs, and wings. According to [2] cells that capture the stimulus are known as neurons, and generally located in the epidermis.

As a dipteran insect, the adult *Stomoxys* flies using their two wings. According to [4] dipthera has sensory organs in their wings which act as a controller while the rear has been modified as a sensory organ. Disaccharide molecules, fructose and glucose on of plant material as organic material

became the most powerful stimulant for flies to get their food [10].

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MATERIALS AND METHODS

1. Experimental and Animals

One-hundred and eight of day-old-chicken broiler CP 707 were purchased and weighed. Their average bodyweight were 43.5 ± 2.63 gram, 5ter that were placed in the pens batteries. A completely randomized design was used with 3 pen replicates of 4 chicks assigned to each of 9 dietary treatments. Mortality was recorded and birds were inspected daily for any health problems.

In other side, the landing periodicity was studied by using the completely randomized design and it was factorial arranged with 3 levels papain (p0 = control, p1 = 0.05% p2 = 0.06%), 3 levels of citronella per 100 kg of rations (c0 = control, c1 = 5gr, c2 = 10 gr) and in 3 period of landing periodicity (t1 = about 06 AM , t2 = 1 PM dan, t3 = 6PM). 4 replication were applied in this works of landing periodicity.

2. Procedure

The observation of the total flies performed the landing in rations was divided in three periods of times: in the morning, middle of the day and at noon. The

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combination of citronella and papain content was performed by mixing the rations treatment into homogeneous elementary and then placed it in a plastic container, and finally placed in the location of the experiment. The treatment of repellents in feed for landing periodicity were done by placing about 100 grams of ration in styrofoam container that has been fitted with a fly glue on two plastic sticks placed

horizontally on styrofoam container. The observation of *landing periodicity* was realized each day by splitting over three periods of time: in the morning, at noon and then at the afternoon.

RESULTS AND DISCUSSIONS

Landing data observations Periodicity (LP) can be seen in Figure 1:

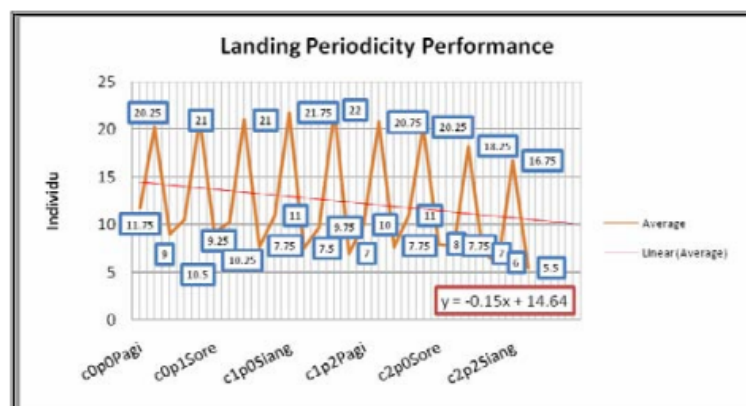


Fig. 1 Landing Periodicity Performance

The figure above represent that the highest average number of LP (landing periodicity) was experienced during the day especially in the treatment c1p1 (22), c0p1 (21), c0p2 (21) c1p0 (21.75), and then it decreased in the morning and afternoon. This suggests that the combination of citronella and papain treatment until level c2p2 can press the range LP up to a maximum of 20 individuals per observation period. This amount related to the activity of flies during the day to search their food as reported by [5] that adult flies actively seek an insect smell of food during the day, but they must be able to select the smell ham while flying in a random manner. The figure showed generally that the lowest LP was in the afternoon and decreased slightly in the morning. The analysis of variance show that there were no interaction between citronella, papain and observation time ($P > 0.05$). It can be caused by the level of c2p2 not affect significantly to effect of stimulation of the organic matter in the ration experiments both the control and the treatment. According to [13] there should

have some factors from its objects to stimulate the flies for landing to the rations.

Although the combination of citronella and papain treatment at t1 (am), t2 (day) and t3 (afternoon) there was no interaction, but statistically showed that a single timing treatment had highly significant ($P < 0.01$) influenced on *landing periodicity* as well as the treatment of citronella, while papain treatment effect was significant ($P < 0.05$). The significant differences was happened due to a single landing periodicity time because the light intensity is helpful to distinguish the insect flies to the objects according to true color and the distance of the object that makes it possible to choose foods. Insects are able to distinguish colors according to wavelength of each object that should be selected as a food source [8].

The natural chemical in plants can contribute stimulatory effect or even inhibitory effect. Citronella and papain are the sample of plant natural chemical that cause inhibitory effect to the insects [10] and they are known as non-DEET substance or

non chemical matterial N,N-Diethyl-metoluamide [1] to avoid diptera [2] and papain is well known also as repellent [11].

The experiments show that a long of the observation there was any broiler death or touched by any infection illness. This performance explain that the treatment of combination of citronella and papain in the ration played an important role in controlling the *Stomoxys calcitrans* as a illness transmitter through the rations materials. In reality during the experiment activities, the animals were never distributed by supplementation of antibiotics neither others anti-microbes.

According to [6] the animals can be protected from the transmissible germ, without using the medical preparation. This condition is linked with the animal biomedical, but it has no relation with the body weight [9]. Concerning to this investigation that all of the experimental animals are protected from the infection of any pathogens micro organism probably caused by their immunity system was well run, and we think also that citronella and papain has important role for their health. Yarru *et al.*, (2009) indicate that there are so many active biomoleculs derived from plants has strong function for the broiler immunity particularly connected to the interleukin 6 dan 2 (IL-6 dan IL-2).

Although all broilers of broiler studied were not applied with feed additive antibiotics or others non-nutritive antimicrobial preparations however the mortality of the animals studies was 0% this is caused by during the study there were never chickens showed a symptom of illness neither death due to disease. In the period before harvest, the mortality in broiler chickens depends on the environmental conditions [12], such as high temperature, high humidity and contamination with microbial pathogens [7]. This performance confirms that the chickens in this study environments are subjected to a combination of citronella and papain to the level c2p2 were not impaired by the infectious disease from pathogenic micro-organisms. The experiments confirms that *the Stomoxys*

calcitrans well develop their population in the area of experimental farm. The lowest of *landing periodicity* was came from animals fed by ration supplemented with citronella at the level of 5gr/100 kg and papain 0.6% in their rations, and therefore citronella and papain can be used as good bio repellent in broiler rations. By using rations containing citronella and papain can minimize landing periodicity of flies *Stomoxys calcitrans* as transmitter disease agents, consequently those bio-repellent attain the number of mortality at a rate of 0% in this experiment.

CONCLUSIONS

The lowest of *landing periodicity* was came from animals fed by ration supplemented with citronella at the level of 5gr/100 kg and papain 0.6% in their rations. Citronella and papain can be used as good bio repellent in broiler rations. By using rations containing citronella and papain can minimize landing periodicity of flies *Stomoxys calcitrans* as transmitter disease agents.

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