BIBLIOGRAPHY

DANNANG, DARYL W. APRIL 2013. Effectivity of Tobacco Leaves against External Parasites in Native Laying Hens (*Gallus gallus domesticus*). Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The study aimed to determine the degree of effectiveness of tobacco leaves and its extract in controlling external parasites of laying hens and the external parasites of laying hens that can be controlled.

A total of 12 native laying hens were used in the study. Following the completely randomized design (CRD), these were divided into four treatments. Each treatment had three replications with one hen per replication, the different treatments were as follows: No tobacco leaves (T_0 or control), Dried tobacco leaves (T_1) Green tobacco leaves (T_2), and Green tobacco leaves decoction (T_3).

Results of the study revealed highly significant differences among treatment means in the number of ectoparasites particularly mites and lice. Practically, mites observed from the treated hens were very much lower in number compared to the control hens or those that were not subjected to tobacco leaves. Mites observed from the control hens had a mean of 145. On the other hand, a mean of 42 was observed from the hens sprayed with green tobacco leaves decoction, 19.67 from the hens treated with green tobacco leaves and zero from the hens treated with dried tobacco leaves.

INTRODUCTION

The domestic native chicken (*Gallus gallus domesticus*) is a mixture of different breeds. They are small active, sensitive and capable of great flight when frightened. The hens are excellent sitters and mothers. Under normal backyard production, the native hen produces 30-60 eggs per year (Walsiyen, 2000).

While native hens are laying smaller number of eggs compared to the commercial strains, still they are maintained most especially by the backyard raisers as their source of meat and eggs. This is because native chickens are easier and cheaper to maintain than the commercial strains. Besides, many of the consumers still claim that the meat and eggs of the farmer of native chickens have better taste than those of the commercial strains.

One of the problems of the backyard native chicken growers, however, is ectoparasitism, affecting not only the birds but even the growers themselves. It is because of the above that the researcher would like to study on the efficacy of tobacco leaves or its extract to remedy the above problem.

Tobacco leaves is a conveniently prepared control agents. The green color of which is fresh and brownish if dried. It has disagreeable-smelling leaves but despite of this, it is believed to be effective against chicken lice and mites or soft bodied insects. Moreover, the tobacco leaves has a control agent over ectoparasites most especially in native hens at laying period.

The study was conducted to establish a baseline data on the effect and uses of tobacco leaves or its extract to control external parasites in native laying hens. The results, if found feasible, will help the native chicken growers most especially the backyard growers because they will be saved from buying commercially available insecticides to

control such parasites. Instead, they can make use of these tobacco leaves in which, to some, is free and readily available.

This was conducted to determine the effect of tobacco leaves and its decoction in controlling external parasites of native hens particularly during the laying period. Specifically, the study aimed to determine the degree of effectiveness of the tobacco leaves and its extract in controlling external parasites of laying hens and the external parasites of laying hens that can killed.

The study was conducted at Balili, La Trinidad, Benguet from October 2012 to January 2013.

REVIEW OF LITERATURE

Classification of External Parasites

Practically all external parasites of birds belong in invertebrate animal group (Phylum Arthropoda). The arthropods are jointed limbed animal without a vertebral column. Nearly all those parasites on birds and on other animals are further characterized by having tracheal tubes for breathing (Benbrook, 1965).

Description of the Common External Parasites

Arends (1991) stated that lice are small and light in color. The smaller varieties move very fast over the skin. Lice are divided into three groups there being several varieties in each group. Each type of bird, such as chicken, turkey, pigeon, duck and goose is infested but separate species of lice. There are more than 40 species of lice reported from domesticated fowls. Fortunately as far as the veterinarian and poultry raisers are concerned, the various species of bird lice at present are all controlled by the same methods.

In 1950, Hurd cited that from the eighteen or more different species of mites, the common red mite is probably the most destructive to poultry. The adult is just visible, normally looks like a gray speck, but when gorge with blood it is distinctly red in color, hence its name. It may be called a voracious blood sucker unlike those of other species such as the scaly leg mites, northern fowl mites, depluming mite, and air sac mites and usually, they hide on the cracks feathers, mostly the nest.

Poultry, seriously infested with the usual external parasites, exhibit irritation and react by scratching, preening, and rubbing. Incipient infestations may less obvious. An

unexplained production drop is a cause to look for external parasites. Lice and northern fowl mites can be found by examining the skin after parting the feathers and also looking along the feathers. The skin an feathers around the vent as well as o the legs, wings, head, neck, breast, and back should be inspected (Matthysse, 1972). In laying hens, most especially after hatching of eggs, the parasites could easily be identified when they transfer to human causing itchiness and irritation as well.

Symptoms of External Parasite Infestation

In the Philippines, most of the encountered constraint was not yet reported especially to smallholder backyard regarding the occurrence of infestations. As a result, with no prevalence of the issues, it can be a problem all year round, particularly in extensive management systems (Daghir, 2008). But mites that normally infest birds also bite people. They can cause a mange-like conditioning pet in itching in people who handle infested pets. They do not stay long on humans.

Most mites never come in contact with humans, but some that do can affect person's health. Yet, in many situations where mites or other "invisible" arthropod are believed to be biting or 'attacking people no causative organism is present. While as we would then imagine mites rarely transmit disease to humans in the United States. They definitely impair health in ways that the range from simply being nuisance when they enter homes in large numbers, to inflicting severe slain irritation that can cause intense itching. (http//www.idph.state.l.us./env-healyh/pcmites.html, 2010).

According to Boyt (1937), Arnold and Arnold (1943), Mandoul *et al.* (1945), Berndt (1915), Brown (1953), and Judd (1956). Those mites that move rapidly over the skin will irritate birds to a considerable degree. Other species burrow in the epithelium,

causing tissue proliferation and scab formation. Feather loss results from invasion of bases being destroyed, or the birds may pull out the affected feathers. Although mites are considered ordinarily to be external parasites, several species invade the subcutis or the internal organs of the birds.

Actually, other mites that cause problems among poultry raisers are scaly leg mites, the depluming mites, and the air sac mites. These poultry mites are parasites. Some spend their entire life on the host. Some stay just to fed themselves (part-time parasites). In the day time they hide in the dark and wall cracks, roost, nests and litter. Both the adult and nymphal stage of red mite is blood suckers. The insect has been shown to be a transmitter of fowl cholera, new castle disease and encephalitis. Feather mites and scaly mites produce lesions on the unfeathered portions of the legs. They bore into the skin covering, causing formation of scale and crusts. The shank of the affected bird becomes inflamed and deformed (Dagoon and Diaz, 1990). Apart from this symptoms are showned by the infest of mites that the birds become unthrifty, pale faced, has feathers ruffled, wings drooping, and there is a lose egg production (Kaupp and Surface, 1938). Moreover, most mites of birds quiet use blood or lymph for food, hence; anemia is more or less constant symptom. It might be expected that blood-sucking mites could easily transmit bacterial and viral infections. The common red mite, Dermanyssus gallinae, has been reported by Hertel (1904), Plasaj (1925) as a transmitter of fowl organisms; and of the fowl spirochaete, Borrelia anserine by Hart (1938).

On the other hand, lice doesn't severely affect human but specifically, they stay on its pre-host. A head louse, Cuclotogaster heterographus and the body lice, Menacanthus straminous, M. curnutus and M. pallidulus are the most common lice

encountered in poultry. Several species may infest the same bird but fortunately the control is similar for all species. Lice spend their life cycle on the host (Card and Neishem, 1972). Eggs are attached often in clusters, to feathers and require 4-7 days to hatch. The entire life cycle takes about three weeks for completion. Stockdale and Raun (1965), working with the chicken body louse, give the incubation period as 4-5 days and each of three nymphal instars 3 days. One pair of lice may produce 120000 descendants within a period of few months. Their normal life span is several months, but away from the birds they can remain alive only 5 or 6 days.

Although bird lice ordinarily eat feather products, it has been showed by Wilson (1993) that Menacanthus stramincus, the chicken body louse may puncture soft quills near the bases and consumes the blood that oozes out. This was confirmed by Crutchfield and Hixsons (1943). In addition, they stated that the body louse draws blood by gnawing through the covering layers of the skin itself. Severe lousiness in poultry originally was thought to follow malnutrition and lead to weight loss as well as to low production. Kartman (1949) also noted that debeaking the bird increased the number of lice present. Edgar and King (1950), studying the effect of moderate infestation by the chicken body louse, concluded louse free-hens averaged about 115 greater egg production that did those infested a difference in net income of 75-85% per bird. Differences body weight and in mortality between the two groups were not significant. A study by Gless and Raun (1959) revealed that an average of 23,000 chicken body louse per chicken reduced egg production by in bred hens and average of 15% to a maximum of 84% during a 14 week period the number of bid used was very small. Stockdale and Raun (1960) could demonstrate an effect of chicken body lice on egg production by

hybrid hens. Further research is needed to quantify economic effect according to the louse species involved. Also, breeding lines of chickens vary in louse susceptibility (Quigley, 1965).

The Effects Parasites Have on their Hosts

In their frequently-cited study, published in *Science* magazine back in 1970, Moss and Camin measured the effect that the martin bird-nest mite, *Dermanyssus prognephilus*, has on martin nesting success. They established two colonies side by side. One was kept as a control, the other was kept mite-free using a miticidal dust. The experiment was repeated for several years, although each year they alternated which house was the control and which was the test house.

Their results showed that although an equivalent number of martin eggs was laid in the nests of each colony, the average number of young fledged by the mite-free birds was 4.2 per nest compared to 3.6 per nest by mite-parasitized birds. During one particularly warm, wet nesting season during this long-term study, the mite population became so severe in the untreated control house that nearly all of the nests were abandoned, while there was no nest abandonment in the treated house 30 feet away. Compare these results with the 4-year test run by the PMCA, reported on pages 28-29, where we eliminated all parasites, not just mites.

Obviously, parasites do lower the reproductive success of their hosts, and during periods of heavy infestation, may actually weaken and kill them. During fair weather, parent birds usually can gather enough food to offset most of the parasite-induced energy drain on their nestlings. But, during poor weather, when the parents can't deliver enough food to the nest, their young weaken, allowing parasites to multiply. It is during these

heavy infestations that parasites cause extreme irritation to their hosts, may lower their resistance to disease, and may actually kill them.

Many disease-producing microorganisms (bacteria, viruses, and protozoans) are dependent on ectoparasites for their transmission. As a result of the blood-feeding habits of ticks, bird-nest mites, lice, fleas, hippoboscid flies, blackflies, mosquitoes, and blowfly larvae, many hosts suffer from anemia. And the skin lacerations left by these bloodsucking parasites can act as portals of entry for bacteria. With all of this in mind, it seems desirable for martin landlords to take proper steps toward controlling the parasites at their colony sites *(*http://purplemartin.org/update/Parasites.html,1994).

Economic Importance

The climatic conditions in tropical countries such as the Philippines are very favorable for the rapid growth and multiplication of parasites an disease producing microorganisms. These, however, should not be considered as deterrrants to the raising of chickens as they can largely control. To take t noticed "prevention rather than cure" that in generally speaking, drugs are of value in poultry raising as disinfectants only. A medical agents they have very limited application. The poultry raiser should take excellent care of his flock in order to prevent disease getting into the premises. It is more important to safeguard a flock against disease infection than to cure, for the cost of medication is proportionally greater than the value of fowl treated. Furthermore, a bird recovering from some infectious disease may be a menace to the flock. Chickens are gregarious animals and are apparently cured fowl may still be a disease carrier and easily infect the entire flock (Fronda, 1972).

On the other hand, external parasites that are causing disease do not severely a killing disease. But this precisely nuisance and impairs feeding growth, conversion efficiency and production losses. It is due also to its resemblance to human situations regarding chicken external parasites such as lice and mites. Occasionally, these chicken external parasites may affect human and foremost to the skin itchiness.

Insecticide of Plant Origins and Control Significance

According to the literature, the tobacco plant is native to central and South America, with over fifty varieties, tobacco belongs to Nightshade Family which includes Belladona (deadly Nightshade), peppers, tomatoes, potatoes, eggplant, and okra (also called lay fingers).

Two varieties of tobacco interest us here. One is Nicotiana rustica, or "true tobacco", which was used by native peoples in the Americas long before the arrival of the Europeans. Tobacco was originally used by Shamans for religious purposes and by medicine men I the Americans. Early explores believed it ad medicinal properties and carried it back to Europe. Moreover, Nicotiana tabacum was once used to make insecticides widely in chicken houses to control mites and lice and in green houses to control sucking insects. Although, it is still used in some countries for this purpose, it is no longer used in the United States (http//www.ho.com/dfacts6730005 nicotiana tabacum html, 2012).

Nicotiana spp. Tobacco and its chief alkaloid, nicotine, have been used since 1690 as insecticides. Nicotine forms salts with acids most of nicotine use for insecticidal purposes in the United States is in the form of sulphate. More than 29 species of nicotiana have been analyzed for their alkaloid content. During 18th century tobacco in crude form,

as an aqueous extract or dust was employed as an insecticide in the vegetable garden of Europe. Commercial preparation of nicotine sulphate was put into market by 1910 and has been popular insecticide ever since, by its triple action insecticidal property acting as stomach contact and fumigant poison. Frear (1955) has reported that as freebase it is more toxic to insects than as sulphate or hydrochloride. The efficiency of nicotine sulphate in spray or dust increases with the increase of alkalinity. The range of insect's subjects to control by nicotine is very wide, although the alkaloid has been reported to be effective against whiteflies, red spider mites, leaf rollers, moths, fruit-free borers, termites, cabbage butterfly larvae and sun lice. Basic nicotine has also aided in the fight against house flies, rats and the lice that infest cattle and horses (Horowit, 1942). Moreover, nicotine is recommended against only those insects that have soft bodied insects and those that are minute in size, such as spider mites aphids, and some external parasites on animals (http:science-n-farming.library for farming.org/insects_2/Insecticides-from-plants-2.html, 2010).

The insecticides of plant which of nicotine was formerly used also in spray dust against lice and as a "fumigant" against poultry lice by painting on the perches, e.g.Blackleaf 40 and actually works fairly well (Hungerford, 1967). In fact cannot be avoided that they still exist on adaptable climate wherein breeding are rapidly fast. Beside this, high ambient temperatures usually increase the population of insects responsible for the transmission of disease. Houseflies (Musca domestica) and related species are very active in hot climates and are involved in the transmission of several poultry diseases (Shane, 1988a). Droppings under cages should allowed to cone dry out or be cleaned up completely or interval of less than 7 days.

MATERIALS AND METHOD

Materials

The materials and equipment that were used in the study were 12 native hens, green tobacco (1 kg) and dried tobacco leaves (1/4 kg), spray bottle, strainer, white cloth, beaker, graduated cylinder, microscope, gas burner, weighing scale, knife, cartons, nesting boxes with rice hulls (Figure 1) , record book, ballpen, prints and camera.

Methodology

Preparation of nests. Twelve (12) woven nests made of bamboo strips that were more or less of the same sizes were prepared. Each nest was enough to accommodate one hen. A piece of carton was placed inside each of the nest afterwhich, rice hulls (Figure 1) were placed on top of the cartons as nesting materials. To avoid interchanging of hens and mixing of eggs, each nest was enclosed from each other (Figure 2).

Figure 1. Sample of the rice hulls used as nesting materials and a woven nest made of bamboo.

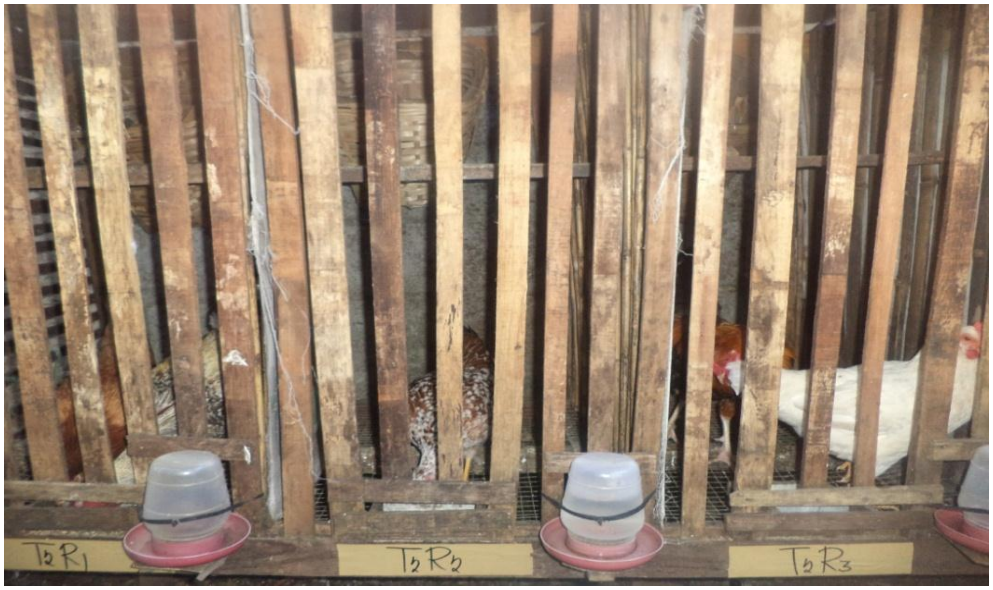


Figure 2. The experimental cages

Preparation of tobacco leaves. The dried leaves were bought from the market particularly in Baguio City while the green tobacco leaves were collected from Tadian, Mt. Province (Figure 3). Both the dried and green tobacco leaves were chopped into smaller pieces first before these were placed inside the nests.

However for the tobacco decoction, the following procedure was followed. A total of 280 grams of green tobacco leaves was chopped into smaller pieces. The chopped tobacco leaves were placed inside a beaker afterwhich 500 ml. of water was poured into it. The beaker was heated using a gas burner and the mixture was strained to separate the decoction. The decoction was placed in a bottle, covered and allowed to cool off. This was set aside ready for application.

Experimental hens and treatments. The 12 hens used in the study were purchased from Rosario, La Union (Figures 6). These hens were grouped into four to compose the four treatments. Each treatment had three replications with one hen per replication.

The different treatments were:

T_0 – No tobacco leaves

T_1 – Dried tobacco leaves

T_2 – Green tobacco leaves

T_3 – Green tobacco leaves decoction

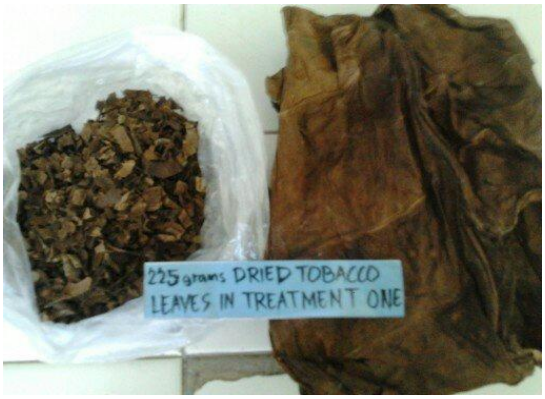


Figure 3. Dried tobacco leaves

Figure 4. Green tobacco leaves

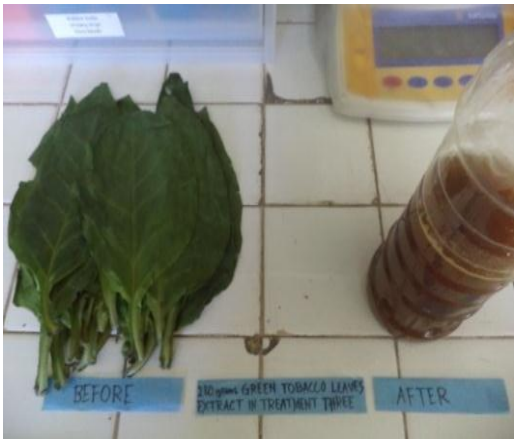
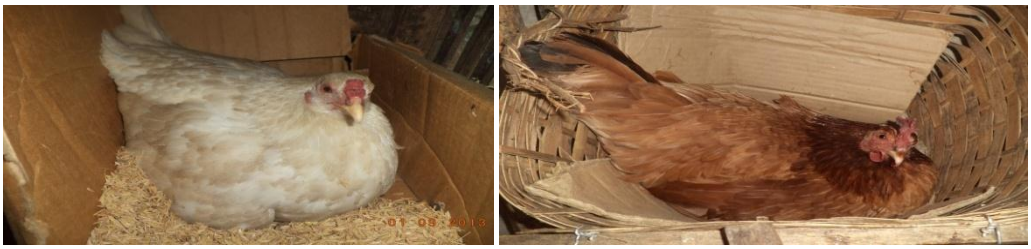
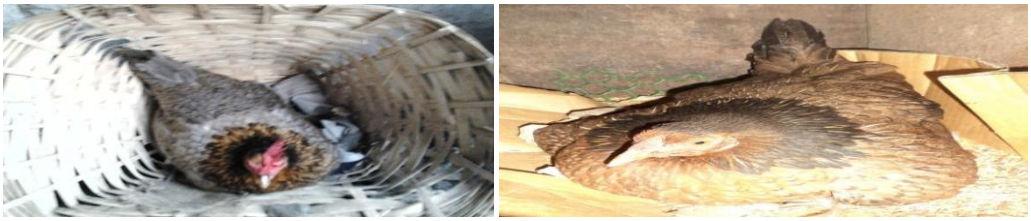


Figure 5. Green tobacco leaves decoction



A. B.



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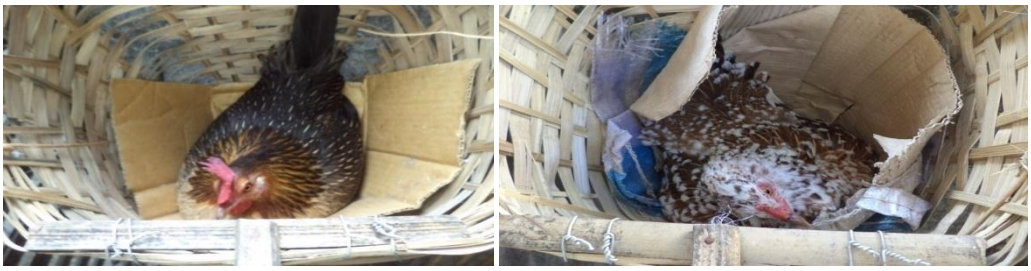
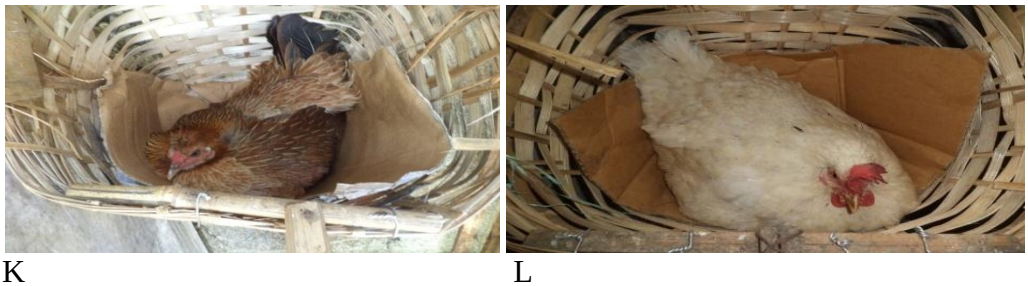
E F.



G. H.

I. J



K L

Figure 6. The hens used in the study: (a-c) T_0; (d-f) T_1; (g-i) T_2 and (j-l) T_3

Management of hens. The hens in all the treatments were subjected to the same management the only difference was in the tobacco leaves applied. In the control group (T_0), no tobacco leaves were used. In treatment 1, chopped dried tobacco leaves (3 medium leaves or 40g/hen/application) were mixed into the rice hulls or nesting materials that were placed inside the laying nests of the hens (Figure 16). In treatment 2, chopped green tobacco leaves (7-8 medium leaves or 80g/hen/application) (Figure 8) were used and in treatment 3, green tobacco leaves decoction was sprayed into the skin and feathers of the hens (Figure 9).

Figure 7. Application of dried tobacco leaves

Figure 8. Application of green tobacco leaves

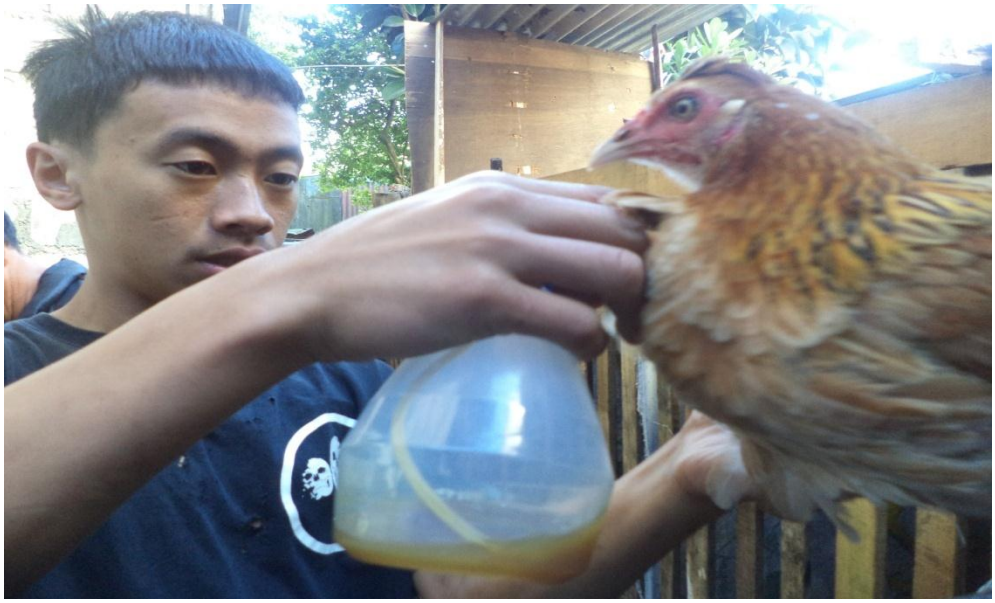


Figure 9. The researcher spraying tobacco decoction into the hen's skin including the feathers.

The first application of tobacco leaves was done the moment the first egg has been laid. The second application was done 7 days after.

All the hens were fed with rice left over or so called 'kinnaban', corn grits and laying mash. Clean drinking water was always available and cleaning of the underneaths of cages was done daily (Figure 10).

Detection of ectoparasites. Detection of ectoparasites was done seven days after application and on the day often the eggs were hatched. The hen was lifted from the nest and allowed to stand into a white cloth for about five minutes, afterwhich, counting of ectoparasites followed (Figure 11).

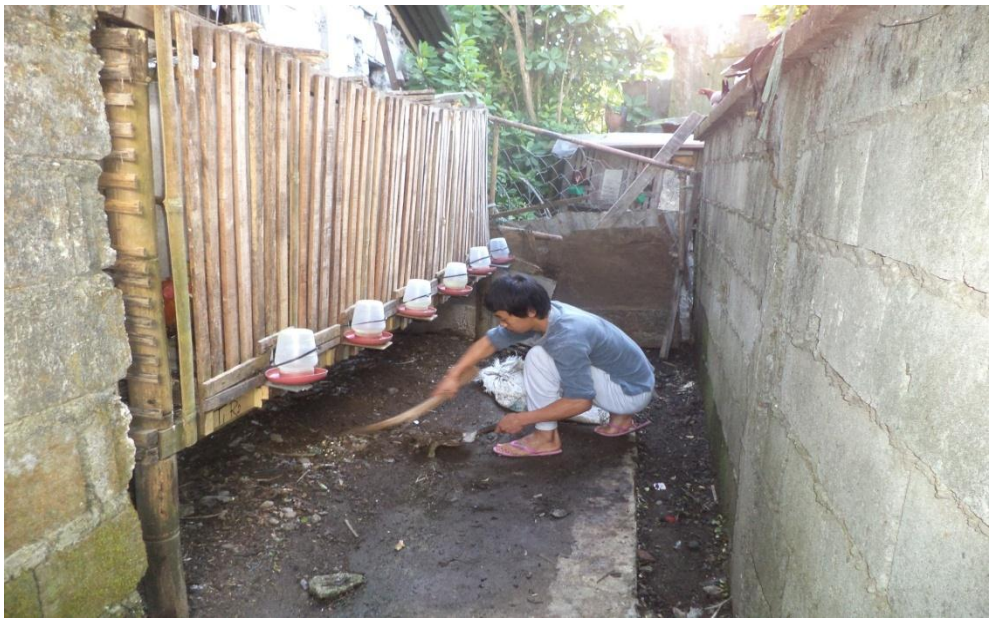


Figure 10. The researcher cleaning the underneath of the cages.

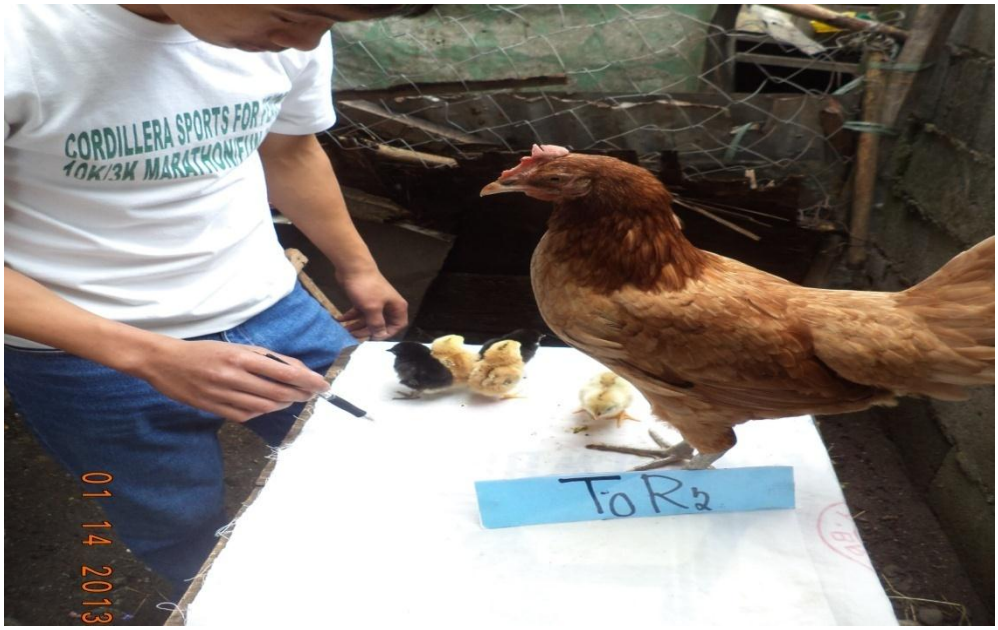


Figure 11. The researcher counting the number of ectoparasites that had dropped onto the white cloth just after hatching of eggs.

Identification of ectoparasites. All the ectoparasites collected had been brought to the laboratory of the College of Veterinary Medicine for identification under the help of Dr. Criselda Battad.

Data Gathered

The data gathered were the following:

1. Number of ectoparasites after application of tobacco leaves. This was obtained by lifting the hen on top of a white cloth for 5 minutes and the ectoparasites that fell on the cloth were counted.

2. Type of external parasite. This was determined by the help of Dr. Criselda Battad at the College of Veterinary Medicine.

3. Observations. This refer to any external change on the body of the hens.

RESULTS AND DISCUSSION

Number of Mites

Table 1 presents the number of mites counted at 7 days after application of tobacco leaves and on the day of hatching. Results reveal that higher number of mites was observed from the control group with mean of 74.67 at 7days after application of tobacco leaves and 145.00 on the day of hatching of the eggs. In the treated group, no mites were collected in all the treatments at 7days after application of tobacco leaves. It was on the day of hatching of eggs when a mean of 42 mites was collected from those treated with green tobacco leaves decoction and 19.67 from those treated with chopped green tobacco leaves. No mites have been collected from those treated with dried tobacco leaves.

Table 1. Number of mites 7 days after tobacco leaves application and the day of hatching

TREATMENT	7th DAYS AFTER APPLICATION	DAY OF HATCHING
T_0 = No Tobacco leaves	74.67[a]	145.00[a]
T_1 = Dried tobacco leaves	0.00[b]	0.00[b]
T_2 = Green tobacco leaves	0.00[b]	19.67[b]
T_3 = Green tobacco leaves decoction	0.00[b]	42.00[b]

*Means with common letters are high significantly different using DMRT at 5% level of significance.

Number of Lice

Table 2 shows the number of lice recorded in each treatment after hatching of eggs. The statistical analysis shows that there exist highly significant differences among the treatments (Appendix Table 3). Similar to the trend in the number of mites, the control, recorded the highest with a mean of 4.00 followed by those treated with chopped green tobacco leaves. No lice were observed from those treated with dried tobacco leaves and those that were sprayed with green tobacco decoction.

The above results reveal that tobacco leaves can be used to minimize mites in native hens most especially if dried tobacco leaves are used. It also agrees with the practice of the native chicken raisers in Kalinga wherein they are putting dried tobacco leaves inside the nests of their native hens as revealed by Ongyao (2007).

Table 2. Number of lice at the day of hatching

TREATMENT	MEAN
T_0 = No Tobacco leaves	4.00[a]
T_1 = Dried tobacco leaves	0.00[b]
T_2 = Green tobacco leaves	2.00[ab]
T_3 = Green tobacco leaves decoction	0.00[b]

*Means with common letters are high significantly different using DMRT at 5% level of Significance.

Type of External Parasites

The ectoparasites from chickens that collected were subjected to a microscope for identification. For the mites, the species only that had been identified was *Orthonyssus bursa* (Figure 12). For lice, the species identified only was *Lipeurus caponis* (Figure 13).

The *Orthonyssus bursa*, is often called the tropical fowl mite. It will attack man, causing pruritus but this is temporary, because this species cannot survive for longer than ten days away from a bird host.

Life cycle. Baker *et al* (1956) stated that, in the laboratory, the eggs are usually laid in the litter not on the host but in birds in the field, large numbers of eggs may be found in the nests of the birds. The eggs hatch in about three days, liberating six-legged larvae, which do not feed, but moult after about 17 hours, to become protonymphs, which feed on the host blood and after one to two days, moult to become deutonymphs, which also feed on the hosts blood and become the adults.

Sample pictures showing the location of mite infestations in the hens in the different treatments are showed in Figures 14 – 22.

Lipeurus caponis, the 'wing louse', on the other hand, is slender elongate louse which occurs on the under-side of the large wing feathers and moves about very little.

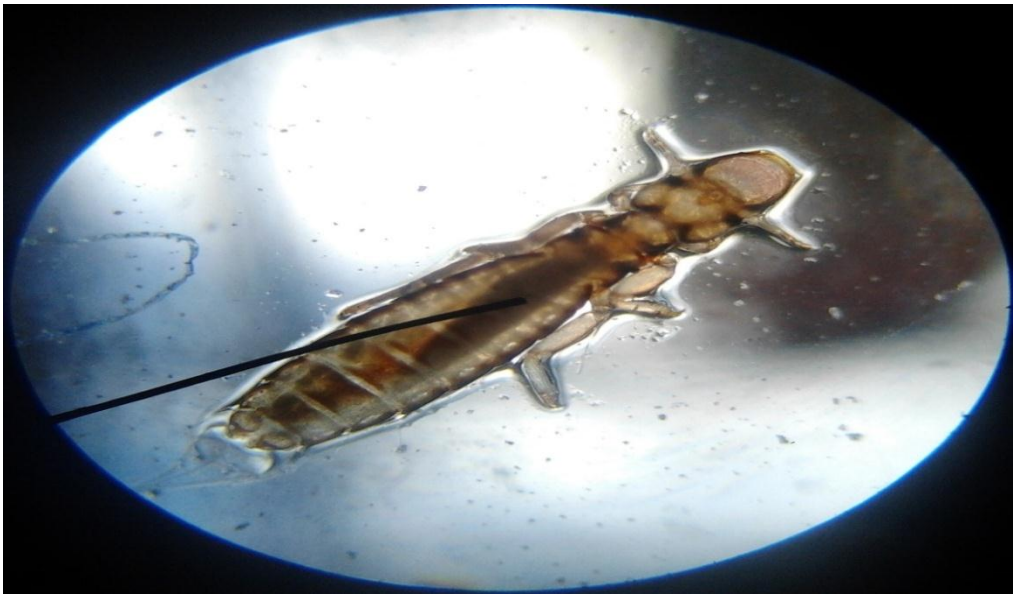


Figure 12. Sample of a *Lipeurus caponis* focused on the microscope

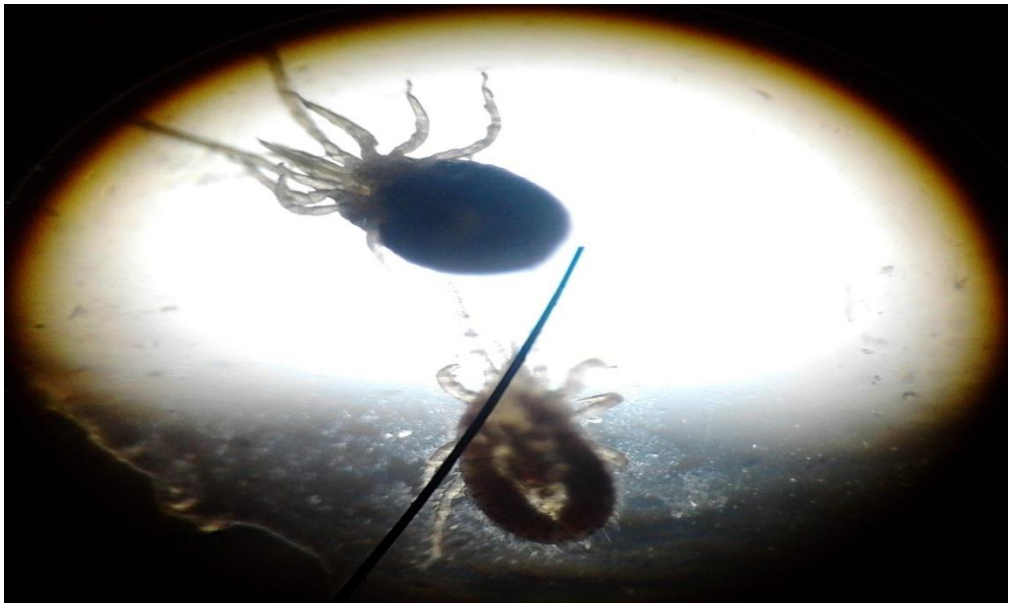


Figure 13. Sample of the *Orthonyssus bursa* focused on the microscope

Figure 14. Mites on the midribs of feather tail of a hen observed in T_0R_1

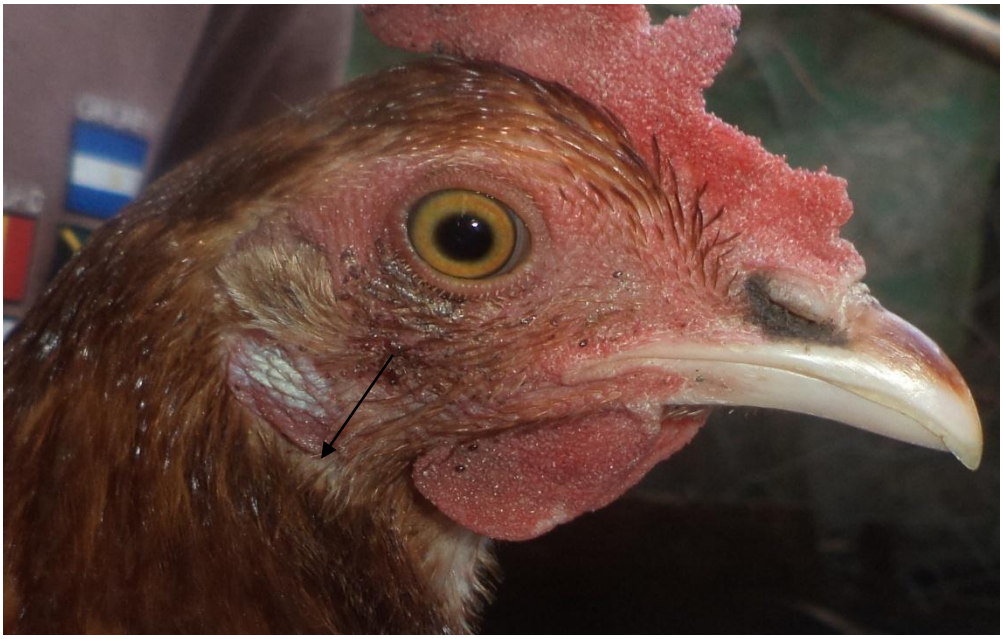


Figure 15. Mites infesting the head of hen causing skin lesion observed in T_0R_2

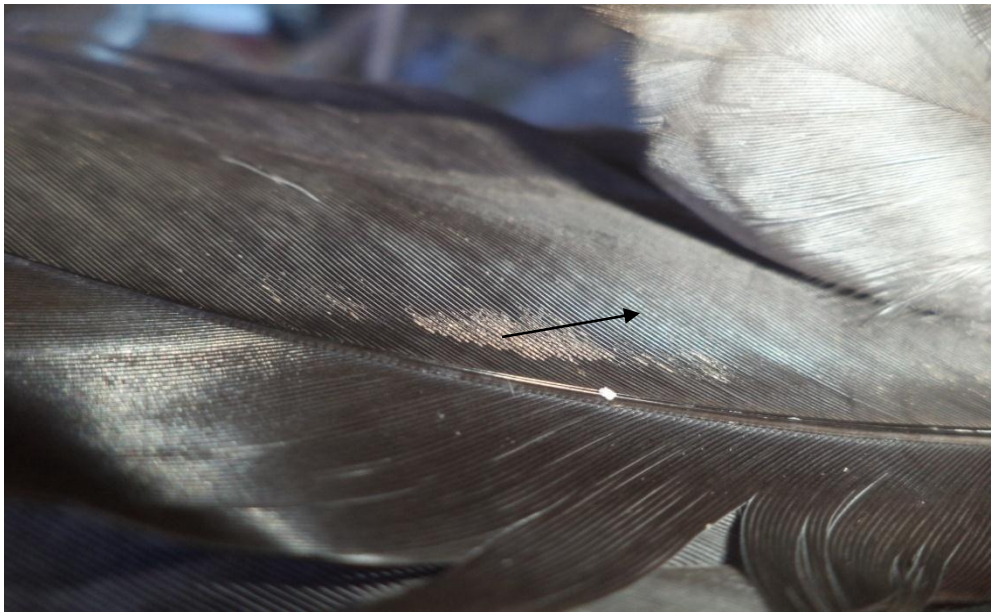


Figure 16. Mites on the feather tail of a hen observed in T_0R_3

Figure 17. Mites on the feather tail of a hen observed in T_2R_1

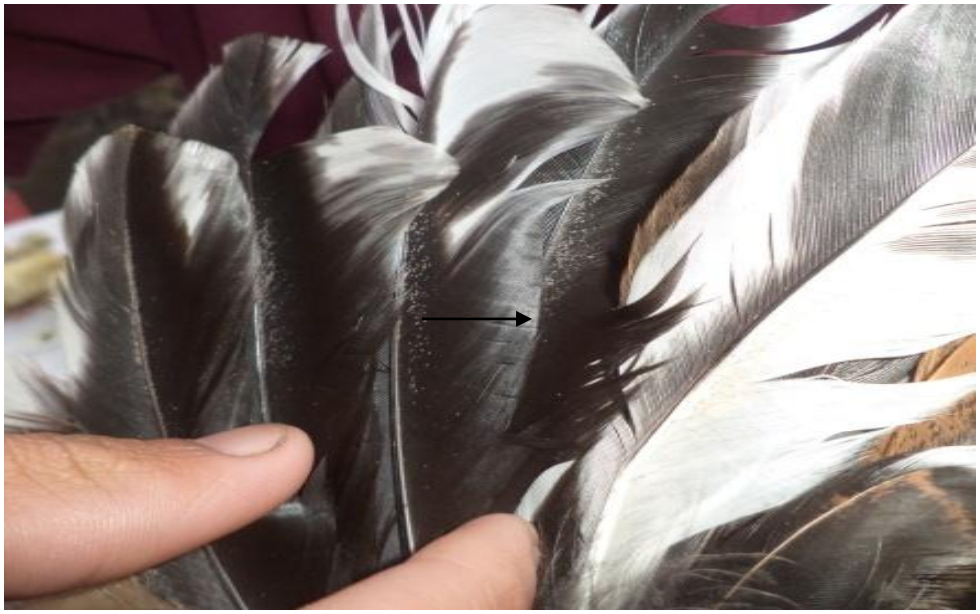


Figure 18. Mites on the feather tail of a hen observed in T_2R_2

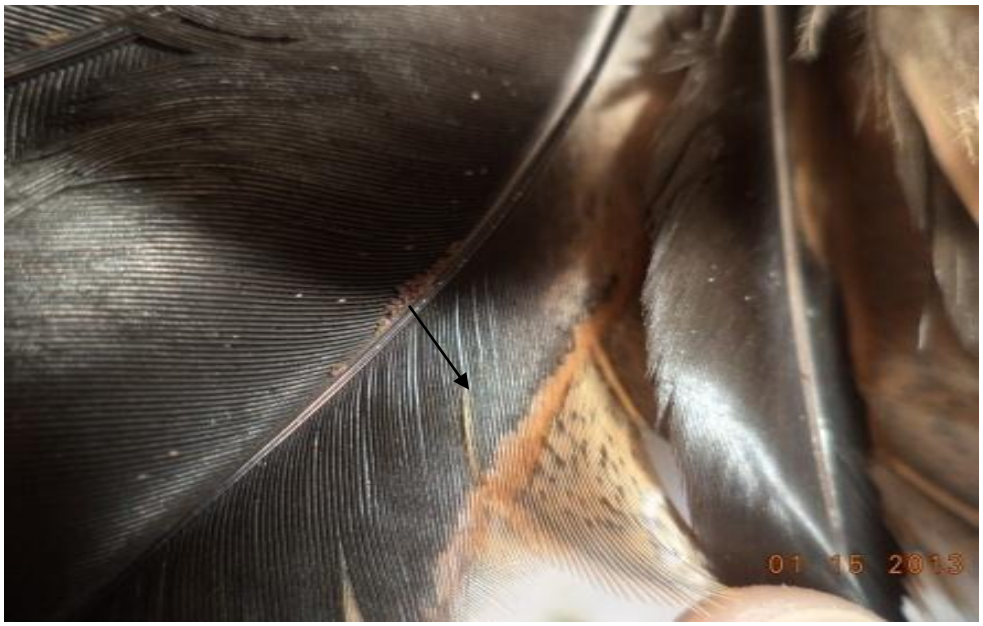


Figure 19. Mites on the midribs of feather tail of a hen observed in T_2R_3

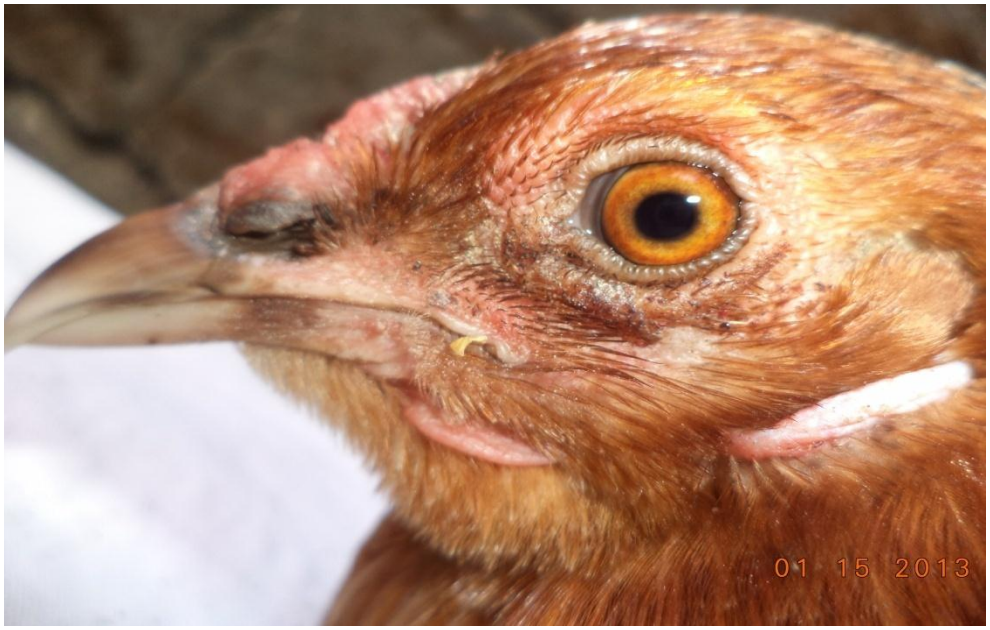


Figure 20. Mites impaired the skin on the head of a hen observed in T_3R_1


Figure 21. Mites on the midribs of feather tail of a hen observed in T_3R_2

Figure 22. Mites infesting the head of a hen observed in T_3R_3

Other Observations

Results of the study showed that the number of 7 days from first day of laying to hatching of eggs ranged from 29-42 days (Appendix Table 4). The number of eggs laid ranged from 7-15 and the number of eggs unhatched ranged from 0-3 eggs.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The study was conducted to determine the effect of tobacco leaves and its decoction in controlling external parasites of native hens particularly during the laying period.

A total of 12 experimental native laying hens were grouped into four to compose the four treatments. Each treatment was replicated three times with one bird per replicate using the Completely Randomized Design as an experimental Design.

Results of the study revealed highly significant differences among treatment means in the number of ectoparasites particularly mites and lice. Practically, mites observed from the treated hens were very much lower in number compared to the control hens or those that were not subjected to tobacco leaves. Mites observed from the control hens had a mean of 145. On the other hand, a mean of 42 was observed from the hens sprayed with green tobacco leaves decoction, 19.67 from the hens treated with green tobacco leaves and zero from the hens treated with dried tobacco leaves.

Conclusions

Based on the results of the study, it is therefore concluded that tobacco leaves can be used to control ectoparasites of laying hens most especially mites. It is also concluded that the most economical way to prevent ectoparasites in native chickens is to use dried tobacco leaves.

Recommendations

Based on the result, it is recommended that tobacco leaves can be used to control ectoparasites of hens at laying period. However, to be more effective, dried tobacco leaves should be used. It is also recommended that related studies should be conducted to include the use of greater amounts when using green leaves.

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