PROJECT INFORMATION

Assessment of Ectoparasite infestation in poultry production systems of Goa and sustainable management interventions

PROJECT OVERVIEW

Funding Agency	ICAR
Total Outlay	Approx 25 lakhs
Duration	3 years
Institution Type	Single
Principal Investigator	Dr. Nibedita Nayak
Co-Investigators	Dr. Amiya R Sahu, Dr. Shirish Narnaware and Dr. Sanjay Udharwar

RATIONALE

Poultry production plays a transformative role in agriculture; in addition to delivering an affordable and efficient source of protein, it significantly enhances nutritional security, creates critical jobs, and generates supplementary income for farmers. Ectoparasite infestation is a common and persistent problem in poultry worldwide. Ectoparasites (lice, ticks, fleas, and mites) adversely affect the health and production, besides being vectors for many transmissible diseases. Poultry red mite induces stress and irritation leading to feather pecking and 15-20% drop in egg production, thinning of egg shell and facilitate secondary disease-causing pathogens (Sparagano et al.,2014). Economic Impact of parasitic infestation: Direct cost of around EUR 0.15/bird for treatments and Indirect cost EUR 0.45./Bird due to reduced productivity and mortality (Van Emous, 2017). Hot and humid climate and climatic variability also contribute the host-parasite dynamics in coastal ecosystem like Goa. Chemical control of the parasites has adverse consequences on individuals, environment and also development of resistance (Lee et al.,2002) Non-toxic means of controlling ectoparasites using plant origin products as they are: Generally regarded as SAFE(GRAS), Cost effective, Environment friendly and easily available. In Poultry, disproportionately little attention in the context of ethnopharmacological research, resulting in few systemic explorations and few commercialized products. This project will study the Prevalence, seasonal abundance and associated risk factors (Breed/sex/age etc) of poultry ectoparasites in different production systems of Goa. Documentation of indigenous ethnoveterinary knowledge for poultry ectoparasite control through focus group discussions and farmer interactions. Then identification of effective indigenous herbs and their efficacy testing for control and management of poultry ectoparasites. These new ethnopharmacological strategies fostering the

knowledge of traditional medicine for management of poultry parasites and judicious use of chemical acaricides will formulate sustainable management of ectoparasites in poultry production systems.

RESEARCH GAPS

Parasitism is the second most significant disease affecting chickens after infectious diseases. Among various parasites, ectoparasites continue to spread worldwide, exerting a detrimental impact on both chicken health and farm economies. In coastal ecosystem with prevailing hot-humid condition favours the growth of ectoparasites. Despite their economic importance, there is dearth of studies regarding their epidemiological patterns, prevalence, seasonal abundance and molecular characterisation. This study aims to assess the prevalence of ectoparasites in chickens in different production systems of goa, documenting their associated risk factors, seasonal abundance and molecular characterisation. This will provide region specific data on ectoparasite manifestation which will facilitate better surveillance and effective control so as to minimise the harmful effect on production and disease spread.This project will address key questions like: What is the prevalence and seasonal abundance of poultry ectoparasites among various production systems in hot-humid climatic condition of Goa What are the effects of these ectoparasites on production and productivity of poultry and their economic significance How effective will be the conventional and molecular methods for their early characterisation and indigenous knowledge for their control What will be the safe and sustainable/Integrated strategies for control of poultry ectoparasites These findings will develop a comprehensive knowledge and its application for integrative strategies for control of poultry ectoparasites as wells as safe-sustainable poultry production.

OBJECTIVES

- To determine the prevalence of poultry ectoparasites in various poultry production systems in Goa and their effect on production performances.
- To identify, collect and document ethnoveterinary knowledge regarding the use of indigenous herbs by local poultry and livestock farmers for ectoparasite control.
- To delineate the phytochemistry and prepare herbal formulations/traps using selected indigenous herbs for ectoparasite control.
- To explore the potential for developing eco-friendly and integrated strategies for ectoparasite management and safe poultry production.

ACTIVITIES

Prevalence of poultry ectoparasites in various production systems of Goa and the associated risk factors

a) Documentation of Ethnoveterinary Practices

1. Conduct structured interviews and focus group discussions with local poultry and livestock farmers and traditional healers.
2. Record herbs used, parts used, preparation methods, dosage, and application techniques.

b) Collection and Identification of Herbs

1. Collect herbs from local areas with farmer guidance.
2. Identify plant species with the help of botanists and herbarium confirmation.

c) Preparation of Herbal Formulations/traps and lures

1. Prepare aqueous and/or ethanolic extracts or powders based on traditional methods.
2. Standardize concentration and dosage for application.

d) In-vivo Efficacy Testing in Poultry

1. Select poultry flocks with natural ectoparasite infestations.
2. Apply herbal formulations topically or through dusting/spraying.
3. Monitor ectoparasite load pre-treatment and at regular intervals post-treatment.
4. Compare with untreated control and standard chemical treatments.

e) Safety and Tolerance Assessment

1. Observe any adverse reactions in poultry post-application.
2. Monitor feed intake, behavior, and any clinical signs during the trial.

f) Data Analysis

1. Analyze reduction percentage of ectoparasites post-treatment.
2. Use statistical analysis (ANOVA, paired t-test) to evaluate efficacy significance.

EXPECTED OUTPUT

Development of standardized herbal formulations and traps-lures that are eco-friendly and farmer-friendly.

EXPECTED OUTCOME

Documentation of indigenous ethnoveterinary Potential reduction in dependency on chemical ectoparasiticides, supporting organic and sustainable poultry farming. Knowledge for poultry ectoparasite control. Identification of effective indigenous herbs for managing poultry ectoparasites.

FIELD INFORMATION

When the field was developed:	Farm was established in 2018 in this context
Common pests and diseases:	**Poultry lice:** *Lipeurus caponis*, *Menacanthus* spp. **Poultry mites:** *Dermanyssus gallinae*, *Ornithonyssus bursa* **Poultry tick:** *Argas persicus*