

*Tephrosia vogelli*: An Effective Organic Acaricide for Livestock Industry.

## **A Case Study from Mbeya and Iringa Regions, Southern Highlands of Tanzania**

### **1.0 Background**

Tick-borne diseases (TBD) are the major cattle diseases constraining livestock industry in the country. East Coast Fever (ECF) alone accounts for more than 65% of all the cattle deaths estimated at 1.1 million heads of cattle. The losses caused by the ECF are estimated up to US\$ 64.7 million annually (Southern Highlands Dairy Development Programme, 2000).

Conventional ways used for combating the ECF and other TBD vectors has been the use of cattle dips or spraying using suitable industrial acaricides. However, in recent years the privatization of veterinary services coupled with the removal of subsidies paralyzed the veterinary services for most of the rural farmers. Out of the total number of 1,658 cattle dips in the country, only 6 percent are still working at any particular time. The private sector was skeptical on the profitability of this business in remote areas other than the urban and peri-urban centres. Similarly, the prices of industrial acaricides were exorbitant making even farmers themselves unable to run dips in their locations. Farmers in some areas started to use medicinal plants in controlling livestock diseases, ectoparasites and vectors. Most of the medicinal plants are generally readily available in the nature. *Tephrosia vogelli* is one of the medicinal plants used as an acaricide by some livestock keepers in the Southern Highlands of Tanzania, as an alternative solution.

### **2.0 Project intervention**

The southern Highlands Dairy Development Project (now SHILDA) among other mandates has been promoting dairy cattle and serving smallholder farmers in Iringa and Mbeya regions. The improvement of Basic Animal Health was one of the activities undertaken by the organization in order to improve livestock health services for farmer households and organizations. The aim of SHILDA intervention was to promote proven cost-effective indigenous technologies in the project area that are affordable by resource poor farmers. Through use of the Participatory Technology Development (PTD) approach to extension, the project has got a better understanding of indigenous farmers' practices.

One pronounced finding concerns the use of *T. vogelli* as an acaricide. The project noted that it is a very promising technology, which could be disseminated to others after doing research on its effectiveness and methods to use as an acaricide. The Livestock Research Centre (LRC) Uyole, with a national mandate for conducting livestock research in the Southern Highlands Zone was identified by SHDDP as the potential service provider for testing and verifying the effectiveness of the *T.vogeli*. A preliminary study on assessment of the availability and extent use of *T. vogelli* in Iringa and Mbeya regions was undertaken by LRC Uyole in collaboration with Veterinary Investigation Centre (VIC) Iringa in 2002.

The target population consisted mainly of dairy farmer groups (DFO) either under SHDDP or Heifer Project Tanzania (HPT) in Iringa and Mbeya regions. Two districts per region and three villages per district were selected for the study. The selection was

purposive, based on renowned use of *T. vogelli* for control of external parasites in livestock. All key stakeholders were properly involved in the interrogation and revelation of information, including district officials, ward and village government leaders and farmers themselves. All village groups and individuals known to use *T. vogelli* were also encouraged to attend the meetings.

### 3.0 Results and discussion

The research findings revealed that *T. vogelli* is a short-lived perennial shrub plant which may attain a height of 2 to 3 meters in a growing season of 5 to 7 months. It contains four insecticidal and pesticidal compounds collectively known as ROTENOIDS. The four active compounds are ROTENONE, DEGUELIN, TEPHROSIN and 6 $\alpha$ ,12 $\alpha$ -DEHYRODEGUELIN. Rotenone and deguelin are the major rotenoid compounds in *T. vogelli* and are the most toxic of the rotenoids. The differences in growing conditions, age of the plant maturity, and varieties grown affect the number of rotenoids present, their concentration in different parts of the plant, and their relative properties. From the research carried out, the lowest concentrations of these toxins were reported in the roots.

The plant is adapted to a wide range of climatic conditions. It can be grown from low altitude (500m asl) to high altitudes (3000m asl). Majority of farmers grow *T. vogelli* as hedgerow plants. The knowledge of cultivation and use of it among farmers is acquired through narration from their parents, neighbors, extension services (public and private (NGOs (CARITAS, HIMA and ADP Mbozi)). Respondents interviewed reported that the white-flowered variety is more preferred by farmers than the purple-flowered variety. However, the reason behind farmers' preferences was not mentioned thus still unknown.

Over 80% of respondents were using *T. vogelli* as an acaricide for more than twenty years now. Training and sensitization seminars conducted by different public institutions/organizations and NGOs on use of indigenous knowledge for sustainable agricultural development, have further promoted the usefulness of the practice in the study areas.

Majority of farmers apply *T. vogelli* as spray solution on livestock using spray pumps. Only few farmers apply the solution by rubbing the animal using a piece of cloth or brush. Chickens are soaked directly into *T. vogelli* solution. The dipping protocol used for conventional sprays once to twice times per week is also adopted for *T. vogelli* use. All steps for preparation of *T. vogelli* solution are geared towards the extraction of the active ingredients especially from the leaves. Leaves are plucked, pounded and soaked into water overnight. The amount of leaves and water used varies from one farmer to another. Before the application of the fermented solution to animals, some farmers do add extra water for dilution purposes. Soap is also added to make the solution stick and remain on the skin of the animals

The extent of use of *T. vogelli* varies among and between (?) farmers, villages and districts surveyed. Uses are? predominant in Mbozi and Rungwe districts than Njombe and Mufindi Districts. *T. vogelli* solution is highly used for treating dairy cattle. The solution is also used in other livestock, such as goats, sheep, pigs, chicken and dogs.

About 90% of farmers interviewed reported that *T. vogelli* is quite effective against many external parasites. They said that the solution extracted from *T. vogelli* is effective against ticks, lice, fleas and mange mites. Upon spraying, washing or dipping animals into the solution, the external parasites die within 2 – 3 hours. However, in comparison with conventional acaricides the solution decomposes quickly, normally after 24 hours.

Although *T. vogelli* is very effective in controlling livestock ectoparasites, some farmers said that *T. vogelli* has been used for a long time in fishing although it is illegal. Farmers reported that the use of *T. vogelli* in fishing causes either deaths or tranquillization of fish depending on the concentration. They further indicated that drowsiness and sedation symptoms may happen to humans when it is used mistakenly.

#### **4.0 Conclusion and Recommendations**

Basing on the efficacy and the local availability of *T. vogelli* herb in the Southern Highlands Zone, *T. vogelli* solution can be used as an acaricide in livestock industry. However, further studies are still needed to find out the proper dosage and methods for use in different types of livestock. There is need to conduct a thorough assessment of the residual effects of *T. vogelli* when applied to livestock on regular basis. The effective ingredients, the age for harvesting leaves and the most appropriate part of plants with high concentration of the active ingredients need further research interventions. The reason behind farmers' preferences of varieties as well as the mode of action of the active ingredients needs also further studies.

#### **5.0 References**

SHDDP, 2000. Southern Highlands Dairy Development Project Exit Phase, 1-55

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