

Awareness and Adoption of *Tephrosia vogelii* and *Nasturtium trapaecolum* for the control of cattle parasites by the Smallholder farmers in Upper Muzarabani District of Zimbabwe

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Abstract

The study was done in the Upper Muzarabani District of Zimbabwe to assess the smallholder cattle producers' awareness and adoption levels on the use of *Tephrosia vogelii* and *Nasturtium trapaecolum* in controlling parasites. Structured questionnaires and participatory rural appraisal techniques were used for data collection. Most farmers (91.7 %) used ethno-veterinary medicine to control diseases and parasites and 8.3 % relied on allopathic drugs. There was no association between trained and non-trained cattle producers on awareness and adoption of ethno-veterinary medicine ($P > 0.05$). Cattle producers were aware (61.7 %) of *T. vogelii* use in controlling ecto-parasites and of these 8.3 % were adopters. Farmers were aware (65 %) of the use of *N. trapaecolum* in controlling endo-parasites and there were non-adopters of the herb. Awareness levels of *T. vogelii* and *N. trapaecolum* in controlling cattle diseases and parasites in smallholder areas are high whilst adoption levels are low.

Key words: Adoption, Awareness levels, Ethno-veterinary medicine, Parasites, *Tephrosia vogelii*, *Nasturtium trapaecolum*

Introduction

Livestock production plays a vital role in food security and poverty alleviation in the smallholder areas of Zimbabwe. One of the major constraints of sustainable smallholder cattle production in Zimbabwe is the persistence of parasitic diseases, particularly during late winter and wet summer periods (Masiga, 1996). Parasites can be classified as external (ecto) and internal (endo) parasites. External parasites occupy the body surface of the animal and ticks are the most common external parasites of economic importance in the smallholder areas of

Zimbabwe. The effects of ticks include inflammation, itching and swelling at the bite site, anemia, irritation and tick worry leading to reduced feed intake, emaciation and development of wounds that may serve as sites for secondary infection. The immune system of the animal infected with ticks drops making it susceptible to many other diseases. Ticks also spread diseases that lead to marked economic losses. Internal parasites attack the inner body mainly the alimentary and respiratory tracts of the animal, and these include roundworms, tapeworms and protozoa. Among the adverse effects of the internal parasites are weight loss, reduced milk yield, poor growth rates, reduced water and feed intake and high mortality rates (Norval, 1983).

Parasites are mainly controlled by the use of conventional drugs and these are expensive, unavailable and associated with high risk for many smallholder cattle producers in Zimbabwe. Ethno-veterinary medicines are cheap, familiar, locally available and easily accessible, and therefore, can be a better alternative. *Tephrosia vogelii* can be used as an insecticide to reduce tick infestation in cattle (Gaskins *et al.*, 1972). The plant is a potential source of rotenone, an important non-residual insecticide. *Tephrosia vogelii* is a multipurpose leguminous plant, native to the tropical countries and has been introduced to Zimbabwe. *Nasturtium trapaeolum* can be used to control roundworms and tapeworms, which are some of the most problematic endo-parasites in the semi-arid agro-ecological zones of Zimbabwe. *Nasturtium trapaeolum*, is native to the cool highlands of mountains extending from Mexico to central Argentina and Chile and has also been introduced to some parts of Zimbabwe.

Ethno-veterinary medicine differs from region to region, among and within communities and hence it is less systematic, less formalized and not universally recognized as a valid method of diseases and parasites control in cattle. Much of this valuable ethno-veterinary knowledge is being lost and/or replaced by modern techniques. Sharing this knowledge is vital to ensure that it is used and is preserved for the future (Scoones *et al*, 1994). These medicines are likely to be more important in future, especially given the escalating costs of drugs and the focus on organic products in most developing countries. This will enforce farmers to preserve and conserve valuable plants thereby enhancing livestock and environmental sustainability. The objective of this study is, therefore, to determine the levels of awareness and adoption of *Tephrosia vogelii* and *Nasturtium trapaeolum* as control remedies for ecto and endo-parasites, respectively in cattle in the Upper Muzarabani District of Zimbabwe.

Methodology

The Study area

The survey was done in the Upper Muzarabani District of Mashonaland Central Province in Zimbabwe. The Upper Muzarabani District is located 200 km Northwest of Harare. It is in agro-ecological zone IV, characterized by low rainfall (400-550mm), high temperatures (26-30°C), short growing periods (100-140 days) and an altitude of 1200 m above sea level.

The sampling method

A total of sixty smallholder cattle producers participated in the survey. The Snowball technique was used to select thirty smallholder cattle producers from four groups that worked with Practical Skills Development Center (PSDC), a non-governmental organization involved in training of agricultural technology awareness and adoption. The other thirty were randomly selected from the four-wards of Upper Muzarabani District. Each smallholder cattle producer was regarded as an experimental unit.

Data collection

The data was collected using structured questionnaires and participatory rural appraisal techniques. The data captured included household demography, prevalent cattle diseases and parasites, methods of controlling cattle diseases and parasites, awareness and adoption levels of *T. vogelii* and *N. trapaeolum* in controlling ecto and endo-parasites, respectively in cattle.

Data analysis

The data was analysed using SPSS (1999) to give descriptive statistics. Chi-square test was used to determine the degree of association between training and awareness, and training and adoption levels.

Results

The majority of the farmers (91.7 %) used ethno-veterinary medicine to control diseases and parasites in cattle and 8.3 % relied on allopathic drugs. Out of the smallholder cattle producers who utilized ethno-veterinary medicine, 54.5 % used the herbs to control external parasites whilst 45.5% used them to control internal parasites. However, overlapping cases were observed in which farmers used both ethno-veterinary medicines and allopathic drugs. The commonly used herbs in the Upper Muzarabani District for the control of cattle diseases and parasites were muroro (*Annona senegalensis*), mugaragunguwo (*Ozoroa reticulata*), gvakava

(*Aloe vera* and *Aloe excelsa*), mhiripiri (*Capsicum annum*) and mutamba (*Strychnos spinosa*) (Table 1).

Table 1: Commonly used herbs in the control of cattle parasites and diseases

Herb	Use	Frequency (% users)
<i>Nasturtium trapaolum</i>	Internal parasites and human health	0
<i>Tephrosia vogelii</i>	External parasite	8.3
<i>Aloe vera</i> (gavakava)	Internal parasites	92
<i>Ozora reticulata</i> (Mugaragunguwo)	Internal parasites	63
<i>Annona senegalensis</i> (muroro)	Internal parasites	27
<i>Strychnos spinosa</i> (mutamba)	Internal parasites and eye problems	71
<i>Capsicum annum</i> (mhiripiri)	Wound healing	33

There was no association between trained and non-trained smallholder cattle producers on awareness and adoption of ethno-veterinary medicine ($P > 0.05$). It was observed that 61.7 % of the smallholder cattle producers were aware of the use of *T. vogelii* in controlling external parasites in cattle, and of these only 8.3 % adopted the use of *T. vogelii*. Sixty-five percent of the smallholder cattle producers in Upper Muzarabani District were aware of the use of *N. trapaolum* as a control remedy for internal parasites in cattle and there were non-adopters of the herb. However, the majority of the smallholder farmers (78%) used *N. trapaolum* for human health.

Discussion

The use of ethno-veterinary medicine more than allopathic drugs to control diseases and parasites in cattle can be attributed to the fact that it is cheap, familiar, locally available and easily accessible (Mathias, 1996). Cattle producers preferred to use ethno-veterinary medicine to control ecto-parasites than endo-parasites because it is less risky and easy to observe effects of the applied herbs. The absence of association between trained and non-trained cattle producers on awareness and adoption of ethno-veterinary medicine is due to the fact that skills were equally developed through trial and error and intentional experimentations, and transmitted verbally across generations (Schwabe, 1984).

The high level of awareness of *T. vogelii* and *N. trapaeolum* is because farmers have a rich store of knowledge on herbal medicines that they have found effective over the years (Fielding *et al.*, 1997). The major limitation to the adoption of *T. vogelii* and *N. trapaeolum* is due to the fact that the preparation process is labour-intensive. Barnes (1967) and Gaskins (1972) asserted that *T. vogelii* has a pungent and toxic smell that is hazardous to humans. Also, the resource-poor farmers are risky averse to adopt new agricultural technologies. The low adoption levels of *T. vogelii* are due to lack of adequate plant stand hence most farmers had insufficient quantities to guarantee herbal plants use in controlling cattle diseases and parasites. The other reason could be that there are more familiar indigenous herbs that have similar ethno-veterinary properties to *T. vogelii* and *N. trapaeolum*. Hence, there is a need to conserve indigenous herbs used as ethno-veterinary medicine in Zimbabwe. There is also competition for the herbs between humans and livestock; humans are highly valued more than cattle.

Conclusion

Awareness levels of *T. vogelii*, *N. trapaeolum* and other herbs in controlling cattle diseases and parasites in smallholder areas of Zimbabwe are high. However, adoption levels are still very low. The smallholder farmers are recommended to use ethno-veterinary medicine, as it is cost-effective, easily accessible, locally available and less risky than allopathic drugs. Further research is required to determine methods of application, specific parasites controlled, factors affecting adoption levels, active ingredients responsible for the control of parasites and thereby coming up with the dose response curve for the herbs. This research may go a long way in improving adoption levels of ethno-veterinary medicine in the smallholder areas of Zimbabwe leading to sustainable livestock production.

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