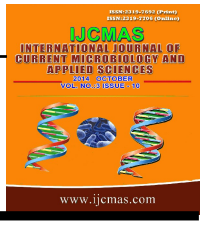
International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 3 Number 10 (2014) pp. 228-232**
http://www.ijcmas.com



Original Research Article

Utilization of herbals for the managements of cattle ticks

S.G.Parte[1], R.D.Patil[2], M.A.Patil[2], N.S.Patel[2] and J.A.Chavan[2]*

[1]Department of Zoology, M. J. S Mahavidyalay, ShriGonda, India
[2]P. G. Department of Zoology, S. G. M. College, Karad, Dist. – Satara, India
**Corresponding author*

Keywords

Acaricidal activity, Aqueous extracts, *Rhipicephalus microplus*

A B S T R A C T

The objectives of this study were to evaluate the acaricidal activity of aqueous extracts five plants against cattle tick, *Rhipicephalus* [Boophilus] *microplus.* Plant materials were extracted with distilled water using soxlet apparatus. Five different plants i.e. *Azadirachta indica, Mangifera indica, Polyalthia longifolia, Annona squamosa, Ficus benghalensis* were studied against the cattle tick and observe the mortality. In present study, combination of five plants extract shows 100% mortality within 32 seconds as compared to single plant extract. The effect of each plant extract requires maximum time to 100% mortality in seconds i.e. 240 sec., 420 sec., 300 sec., 240 sec., 300 sec. in *A. indica, M. indica, P. longifolia, A. squamosa, F. benghalensis* respectively.

Introduction

The cattle tick, *Rhipicephalus* [Boophilus] *microplus* is one of the most economically important tick species throughout tropical and sub-tropical countries and damaging the live stock industries**.** It has been recorded on "cattle**,** buffalo, horses, donkeys, goats, sheep, deer, pigs, dogs and some wild animals". It is found in Asia, some parts of Australia, Madagascar, southeastern Africa, Caribbean, South and Central America and Mexico *etc.* The use of tickicide for control of tick populations is serious problem which causes environmental pollution and disturbs the non-targeted species (Boeke *et al.,* 2004). This condition creates the need for alternative tick control methods with lesser problems to the environment.

Scientific research on plant based products that are toxic to ticks is intensifying. This is primarily a result of the recognition of plants as the potential sources of anti-tick agents by many scientists (Abdel Shafy and Zayed, 2002; Franscisco *et al.,* 2003). One of the commonly cited advantages that may result from the use of botanicals for tick control is their biodegradability (Liang *et al.,* 2003).

This would make botanical acaricides to be less toxic to the environment and non-targeted species. So far, promising results have been obtained from some plants screened for anti-tick properties. For example, on the sticky secretions of some tropical pasture legumes of the genus

Stylosanthes, which immobilize and kill ticks reported by Wilson and Surthest (1990). Also, Nchu *et al.,* (2005) demonstrated the toxic effects of dichloromethane extracts of garlic (*Allium sativum*) bulb on adults of *Hyalomma marginatum* rufipes and *Rhipicephalus pulchellus*. However, despite the promising results indicated in the foregoing paragraph many plants are still scientifically untested for antitick properties. In an attempt to contribute towards this need, we examined the effects of the five plant leaves aqueous extracts against adults of *Rhipicephalus* [Boophilus] *microplus.*

Harm and economic loss due to boophilus ticks on cattle

Boophilus ticks are certainly the most damaging cattle parasite. Each tick bite causes stress and weakens the host. It has been estimated that 20 to 30 ticks already have a negative impact on cattle (reduced weight gains, decreased milk production, higher susceptibility for diseases or other parasites, etc.). More specific calculations indicate that, an infestation with 50 or more engorged *Boophilus* female ticks causes an annual weight reduction of 0.5 kg per tick. In dairy cows reduction of the annual milk production was up to 200 liters per animal. The economic impact of tick-borne diseases can be much more dramatic in case of a sudden outbreak of a tick-borne disease in a susceptible herd and causes dozens of deaths.

It must be mentioned that, not only the visible engorged adult females causes harm and transmit tick-borne diseases but, hidden larvae and nymphs also causes severe infestation. Therefore, present investigation will add great relevance to control ticks and simultaneously helps for tick borne diseases.

Materials and Methods

Preparation of plant extract

Five different plants i.e. *Azardirachta indica, Mangifera indica, Polyalthia longifolia, Annona squamosa, Ficus benghalensis* have been collected from different localities from Karad city. The leaves of all plants were brought into the laboratory and washed with distilled water and dried. After complete drying, the plant material is powdered in mortar pestle. The power of five different plants was processed for extract preparation by using soxlet apparatus. The aqueous extract prepared by using soxlet apparatus is concentrated, air dried and used for further experiment study.

Collection of ticks

R. microplus ticks were used for evaluation of acaricidal activity. Adult blood engorged female ticks were removed & collected from the body of naturally infested cattle and identified by the entomologist in the S.G.M. college Karad. Ticks were maintained in the laboratory at 25 ± 2ºC and 75 ± 5% RH in the Department of Zoology at the S. G. M. College, Karad. According to methods described by Winston and Bates (1960) the relative humidity (RH) was attained by using in glass humidity chambers.

Antiacaricidal activity tests

For testing the antiacaricidal activity nine different groups of test animals were prepared for experimental purpose. Each group contains five ticks. The group -1 was taken as control, while other eight groups were taken as experimental groups. The aqueous extract of each plant leaf powder (5mg/ml) was used for antiacaricidal activity. The drop wise addition of plant

extracts on the experimental animal and distilled water on control animals were carried out. The time taken for 100% mortality was notified. The single plant extract as well as different combination of plants extract were tested for their antiacaricidal activity. The topical application method have been successfully used previously by other researchers (Pascual-Villalobos and Robledo, 1998; Nchu *et al.,* 2005) in screening plants for anti-tick properties.

Results and Discussion

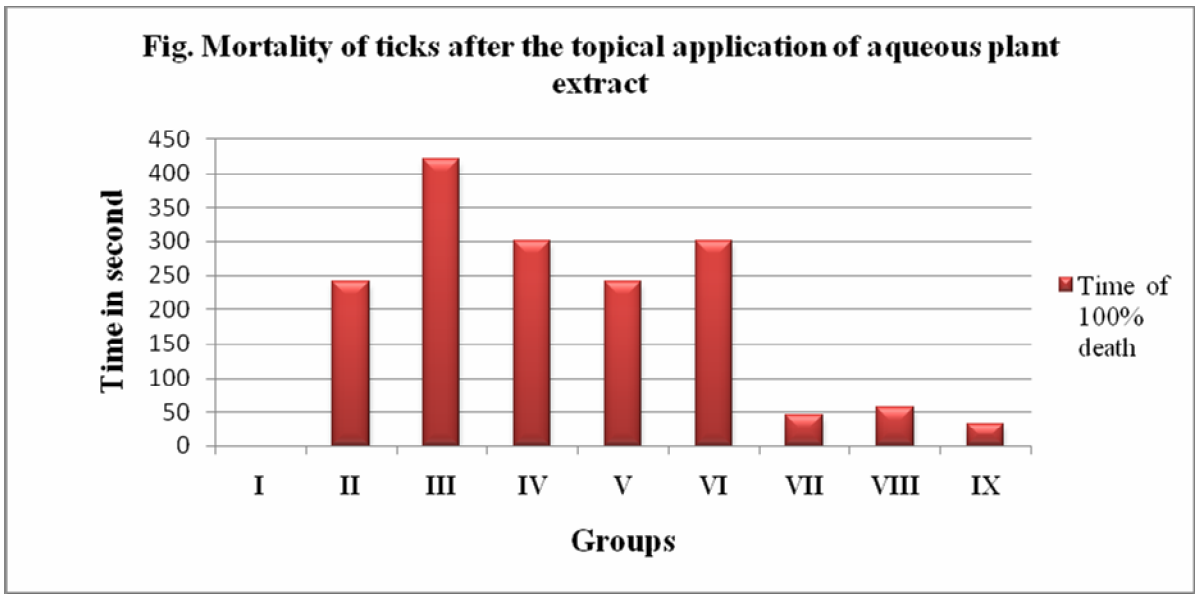
The time taken for 100% mortality in each group recorded in table -1. The result indicates that, plants extract combination shows high rate of mortality in minimum seconds as compared to single plant extract. The combination of all 5 different plants extract shows 100% mortality occurs within 32 seconds.

The antiacaricidal studies shows combined extracts of leaves of *A. indica* seeds of *A. squamosa* were found promising. The plants includes in this study were selected on the basis of their reported acaricidal activities frequency of uses in traditional veterinary medicine. The *A. indica* is one of the commonly grown indigenous plants in farmer's fields. It is an extensively studied medicinal plant throughout the world. It passes a wide range of biologically active compounds and has been evaluated for acaricidal, insecticidal and molluscidal activities.

Extracts of *Azadirachta indica* inhibits egg production of immerseal *B. microplus* ticks and weekly spraying with neem seed extracts decreases the number of ticks. The rate of ticks was lower in animals receiving higher doses of azadirachtin. Magano (2008) studied the anti-tick properties of the root extract of *Senna italica* subsp. arachoides against adults of *Hyalomma marginatum* rufipes.

Table.1 Effect of aqueous extract of different plants on acaricidal activity and percent mortality in time (Minute) at concentration 5mg/ml

Groups	Name of plant	Concentration 5mg/1ml	Time of 100% death (Time in Second)
I	Control	Distilled water	No mortality
II	*Azadirachta indica*	5 mg/ml	240 ± 0.03
III	*Mangifera indica*	5 mg /ml	420 ± 0.05
IV	*Polyalthia longifolia*	5 mg /ml	300 ± .010
V	*Annona squamosa*	5 mg /ml	240 ± 0.07
VI	*Ficus benghalensis*	5 mg /ml	300 ± 0.40
VII	*Azadirachta indica + Annona squamosa + Polyalthia longifolia*	5 mg /ml	46 ± 0.02
VIII	*Ficus benghalensis +Mangifera indica + Polyalthia longifolia*	5 mg /ml	56 ± 0.23
IX	*Azadirachta indica + Annona squamosa + Polyalthia longifolia + Ficus benghalensis + Mangifera indica*	5 mg/ml	32 ± 0.01



The idea of investigating the effects of combined plant products has been exploited by many researchers. For example, Rajapakse and Van Emden (1997), investigated the arthropocidal effects of botanical oils as well as combined effects with other plant products. But, Liu (2003) suggested that isolated compounds may either lose their bioactivity or may not behave the same way as the compound in a whole mixture. In the present study combined effect of all the 5 plants shows the tremendous death (100 % mortality) of ticks within 32 seconds. Therefore these five plants may be source of anti-tick agent.

Acknowledgements

Authors are thankful to Head P. G. Department of Zoology, Sadguru Gadage Maharaj College, Karad for providing laboratory and other infrastructural facilities.

References

Abdel-Shafy S., Zayed A. A., 2002. In vitro acaricidal effect of plant extract of neem seed oil (*Azadirachta indica*) on egg, immature and adult stages of *Hyalomma anatolicaum* excavatum (Ixodidoidea; Ixodidae). *Vet. Parasitol.* 106: 89-96.

Boeke S.J., Baumgart I.R., van Loon J.J.A., van Huis A., Dicke M., Kossou D.K., 2004. Toxicity and repellence of African plants traditionally used for the protection of stored cowpea against *Callosobruchus maculatus*. *J. Stored. Prod. Res.* 40: 423-438.

Franscisco M.C., Carlos C.V., Manual R., Jorge M.T., Jorge S.C., Miguel R.P., 2003. Repellence of *Boophilus microplus* larvae in *Astyposanthes humilis* and *S. hamata* plants. Parasitol. *Latinoam*. 58: 118-121.

Liang G.M., Chen W., Liu T.X., 2003. Effects of three neem based insecticides on diamondback moth (Lepidoptera: Plutellidae). *Crop Protection*. 22: 333-40.

Liu R.H., 2003. Health benefits of fruits

and vegetables are from additive and synergistic combinations of phytochemicals. *Am. J. Clin. Nutr*. 78: 5178-208.

Magano S.R., Thembo K.M., Ndlovu S.M., Makhubela N. F. H., 2008. The anti-tick properties of the root extract of *Senna italica* subsp. arachoides. *African Journal of Biotechnology* Vol. 7 (4), pp. 476-481.

Nchu F., Magano S.R., Eloff, N., 2005. In vitro investigation of the toxic effects of extracts of *Allium sativum* bulbs on adults of *Hyalomma marginatum* rufipes and *Rhipicephalus pulchellus*. *J. S. Afr. Vet. Ass.* 76: 99-103.

Pascual-Villalobos M. J., Robledo A., 1998. Screening for anti-insect activity in Mediterranian plants. *Inst. Crops Prod*. 8: 183-194.

Rajapakse R., Van Emden H.F., 1997. Potential of four vegetable oils and ten botanical powders for reducing infestation of cowpeas by *Callosobrucuhus maculates, C. chinensis* and *C. rhodesianus*. *J. Stored Prod. Res*. 33: 59-68.

Wilson L.J., Surtherst R.W., 1990. Oviposition sites of *Boophilus microplus* in Stylosanthes and grass pastures. *Austr. J. Entomol.* 29: 101-105.

Winston P.W., Bates D.H., 1960. Saturated solutions for the control of humidity in biological research. Ecology, 41:232-236.