International Journal of Veterinary Sciences and Animal Husbandry 2019; 4(3): 19-21

ISSN: 2456-2912
VET 2019; 4(3): 19-21

www.veterinarypaper.com
Received: 13-03-2019
Accepted: 14-04-2019

Bigya Dhital
Student (B. V. Sc. and A. H.), Purbanchal University, Nepal

Rameshwor Pudasaini
Assistant Professor, Tribhuvan University, Nepal

Correspondence
Bigya Dhital
Student (B. V. Sc. and A. H.), Purbanchal University, Nepal

Efficacy of different ethno-veterinary products against cattle ticks in Nepal

Bigya Dhital and Rameshwor Pudasaini

Abstract
Ticks cause serious economic losses in cattle and an experiment was conducted to test efficacy of different ethno-veterinary products against ticks in Lamjung, Nepal during 2017-2018. The experiment was designed in completely randomized design with seven treatments and four replications. Cattle ticks (*Rhipicephalus* (*Boophilus*) *microplus*) were collected, reared and produced next generation for the test. After 1 hour of treatment application, least number of ticks were found live in Cypermetrhrin application (2.5%) followed by Neem (10%), saltwater (25%), chinaberry and Mug-wort (27.5%). This study clearly shows that different ethno-veterinary products may be the alternative to manage the cattle ticks in the context of developing resistancy to acaricides.

Keywords: Ethno-veterinary products, cattle ticks

1. Introduction
Ticks cause serious economic losses in livestock industry (Gray, 1985, Sonenshine, 1991; Dhital, 2018) [7, 14, 24]. It has been studied that about 80% of the world cattle population is infested with ticks (Bowman *et al*., 1996) [4]. Ticks transmitted viral, bacterial and protozoan pathogens causing diseases like hemorrhagic fever, ehrlichiosis, anaplasmosis, theileriosis, and babesiosis in meat and dairy animals (Rajput *et al*., 2006) [22]. The efficacy of some acaricides against some ectoparasites became questionable (Hogsette, 1999) [15]. It is reported that ticks developed resistancy to different acaricides in different parts of world (George *et al*., 2004; Kunz and Kemp, 1994) [10, 17]. Tick had the excellent capacity to develop resistance to the acaricides (Solomon, 1983) [23]. It is reported that ticks developed resistance to Amitraz in different parts of Kenya (Kamidi and Kamidi, 2005) [16]. Similarly, resistance is normally seen with more than one class of acaricide in Mexico (Foil *et al.*, 2004) [9] and multiclass resistance is general in Brazil (Graf *et al.*, 2004) [13]. Foil *et al.* (2004) [9] gave an average of 12 years for evolution of resistance to Amitraz. Different study report showed that ticks causes serious losses on cattle farming in Nepal (Bohara and Shrestha 2016; Dhital. 2018; Dhital *et al*., 2018) [2, 7, 8] and development of resistancy to different acaricides were also reported in Nepal. Traditionally farmers were using different plant and other products to manage ticks and other ectoparasites in Nepal. However, there is no any scientific study on these products. Hence, it seems necessary to evaluate the efficacy of different ethno-veterinary products against ticks.

2. Material and Methods
An experiment was conducted to test efficacy of different products against ticks in Lamjung, Nepal during 2017-2018. The experiment was designed in completely randomized designs with seven treatments and four replications namely; Neem (*Azadirachta indica*) leaf extracts solution, Chinaberry (*Melia azedarach*) leaf extract solution, Mug-wort (*Artemisia vulgaris*) leaf extract solution, Salt-water solution, Cypermetrhrin and control (no products application).

2.1 Collection of Ticks
Randomly 20 cattle ticks (*Rhipicephalus* (*Boophilus*) *microplus)* were collected from Bageshwori Gaushala, Bharatpur, Chitwan, Nepal in March, 2018. Ticks were collected manually using a forcep and gloves. The collected ticks were stored in a sterile container.

2.2 Rearing of ticks
Collected ticks were reared in Entomology lab at Institute of Agriculture and Animal Science, Lamjung Campus. After about 3-4 days ticks were found laid eggs and after one month eggs were hatched out into larvae. Then after fifth days of hatching, ticks were allocated for the testing the efficacy of different botanical product. Ten immature ticks were allocated in each petridis and applications of treatments were done accordingly.

2.3 Preparation of different products
Neem (*Azadirachta indica*) leaf extracts solution, Chinaberry (*Melia azedarach*) leaf extract solution, Mug-wort (*Artemisia vulgaris*) leaf extract solution, Salt-water solution, Cypermetrhrin. Leaves of Neem, China berry, Mug-wort, Tobacco were grinded and produced its extract. Similarly, mixture of 100 gram common salt (NaCl) and 200 ml water were used for the another treatments. Tik-out (Cypermethrin 100 EC) was used as chemical pesticides against the ticks.

2.4 Statistical Analysis
All the information collected during study including qualitative information were coded and tabulated in Excel sheet. Statistical tools R 4.2.2 were used for the analysis. The recorded data were subjected to analysis of variance (ANOVA) and significant mean differences were separated by Duncan's Multiple Range Test (DMRT) at 0.05 percent level of significance (Gomez and Gomez, 1984) [12].

3. Results
As presented in Table 1 and Figure 1 highest number of dead ticks were found in Cypermethrin treatment followed by Neem whereas least in Chinaberry treatment after 10 min and 1 hour of treatment application. After 1 hour of treatment application, least number of ticks were found live in Cypermetrhrin application (2.5%) followed by Neem (10%), saltwater (25%), chinaberry and Mug-wort (27.5%). All ticks were found live in control treatment.

Table 1: Efficacy of botanical product after 10 mins and 1 hrs of treatment application, 2017/018

S. N.	Treatment	Average live ticks number after 10 min of treatment application	Average live ticks number after 1 hr of treatment application
1	Neem	8.25cd	0.75d
2	Chinaberry	9.25ab	3.75b
3	Mug-wort	8.75bc	2.75c
4	Tobacco	8.5bc	2.75c
5	Saltwater	8.75bc	2.50c
6	Cypermethrin	7.5d	0.50d
7	Control	10.00a	10.00a
Test of Sign.		***	***
Grand Mean		8.71	3.28
LSD		0.85	0.85
CV		6.62	17.57
EMS		0.33	0.33

* Means followed by the same letter in each column are not significantly different by DMRT at < 0.05 percent level

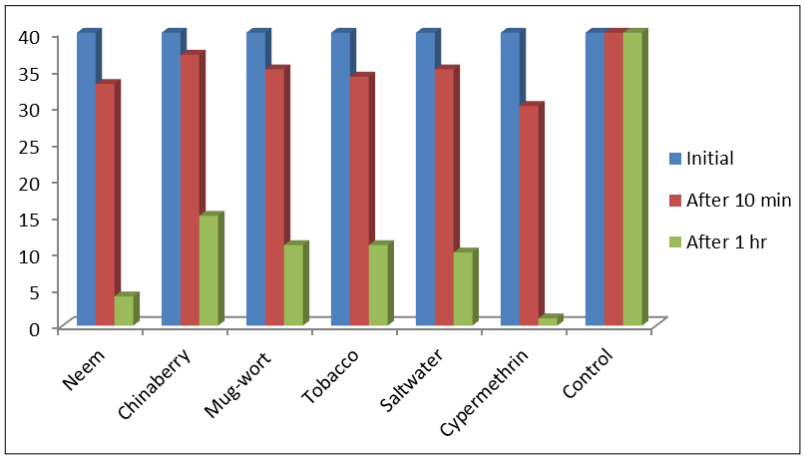

Fig 1: Live ticks after different times of treatment application in Lamjung, Nepal, 2017/018

4. Discussions
Different botanical and other products were found effective for the control of tick which is supported by different other reports. Among the tested products Neem was found most effective followed by salt water, Mug-wort (*Artemisia vulgaris)*, tobacco (*Nicotina tobaccum*) and chinaberry (*Mellia azadiract*). It is reported by Ghosh *et al*. (2007) [11] Neem (*Azadirachta indica*) against different life stages of ticks were highly encouraging. Neem contain Azadirachtin which possesses insecticidal property (Nawrot, and Harmatha, 1994; Vietmeyer, 1992) [18, 26]. Tobacco (*Nicotiana tabacum*) is used in eradication of external pest of cattle infestation and mange (Davidovic *et al*., 2011) [6]. It is reported that tobacco leaves (*Nicotiana tabacum* Linn., Solanaceae) have been used as insecticide and pesticide for long time (Abdul-ghany *et al*., 2011) [1]. Carlile (2006) [5] remarked that nicotine will rapidly penetrate the cuticle of the target organism, and can be used effectively as a contact insecticide. Mug-wort *(Artemisia vulgaris)* was using in the treatment of animals infected by blood parasites by rubbing the ground fresh leaves (Davidovic *et al*., 2011) [6]. Essential oils from *Artemisia vulgaris* work against insect (Bouzenna and Krichen, 2013; Negahban *et al*.,

2007; Negahban *et al*., 2006) [3, 19, 20]. The mechanism behind the insect mortality in the contact toxicity test is that the volatiles penetrate in the insect body via the respiratory system and result in abnormal breathing, which leads to asphyxiation and finally the death of insects (Pare and Tumlinson, 1999) [21]. According to the Tvedten (2016) [25] salt desiccated and killed the ticks. Zewdie (2010) [27] also reported salt water as the effective control measure for the control of ticks.

5. Conclusion

Ethno-veterinary management practices are also effective as compared to chemical pesticides for the tick control. Therefore, there is a need for further studies on the efficacy of such products which have lower side-effects and reduces the problem of resistance which is prevalent in the use of chemical acaricides.

6. References

1. Adul-ghany S, Hena H, Ardalan S. Insecticidal effects of some aqueous plant extracts on the control of Khapra Trogoderma granarium *Evert*. International Conference on Chemical, Biological and Environment Sciences (ICCEBS'2011) Bangkok, 2011, 288-292.
2. Bohara TP, Shrestha SP. A study on cattle tick and tick borne pathogens of Mid Western. Nepelese Veterinary Journal. 2016; 33:23-27.
3. Bouzenna H, Krichen L. *Pelargonium graveolens* L. and *Artemisia arborescens* L. essential oils: Chemical composition, antifungal activity against *Rhizoctonia solani* and insecticidal activity against *Rhyzopertha dominica*. Natural Product Research. 2013; 27:841-846.
4. Bowman AS, Dillwith JW, Sauer JR. Tick salivary prostaglandins: presence, origin and significance. Parasitology Today. 1996; 12: 388-396.
5. Carlile WR. Pesticide Selectivity, Health and the Environment. Cambridge University Press. Cambridge, 2006.
6. Davidovic V, Todorovic MJ, Maksimovic Z, Hristov S, Stankovic B, Relic R. A review of plants used in Ethnoveterinary medicine. Macedonian Journal of Animal Science. 2011; 1(2):377-382.
7. Dhital B. Farmer's perception on ticks problems and ethnoveterinary management practices in livestock. Journal of Animal Science and Veterinary Medicine. 2018; 3(5):154-159.
8. Dhital B, Shrestha S, Kaphle K, Pudasaini R. Distribution of the cattle ticks from mid hills to plains of Nepal. Journal of Agriculture and Natural Resources. 2018; 1(1):197-205.
9. Foil LD, Coleman P, Eisler M, Fragoso-Sanchez H, Garcia-Vazquez Z, Guerrero FD *et al*. Factors that influence the prevalence of acaricide resistance and tick-borne diseases. Veterinary Parasitology. 2004; 125:163-181.
10. George JE, Pound JM, Davey RB. Chemical control of ticks on cattle and the resistance of these parasites to acaricides. Parasitology. 2004; 129(7):353-366.
11. Ghosh S, Azhahianambi P, Yadav MP. Upcoming and future strategies of tick control: a review. Journal of Vector Borne Disease. 2007; 44:79-89.
12. Gomez KA, Gomez AA. Statistical procedures for agriculture research. John Wiley and Sons, New York, USA, 1984.
13. Graf JF, Gogolewski R, Leach-bing N, Sabatini GA, Molento MB, Bordin EL *et al*. Tick control: an industry point of view. Parasitology. 2004; 129:427-442.
14. Gray JS. Ticks: their economic importance and methods of control. Outlook on Agriculture. 1985; 14:136-142.
15. Hogsette JA. Management of ectoparasites with biological control organisms. International Journal for Parasitology. 1999; 29(1):147-151.
16. Kamidi RE, Kamidi MK. Effects of a novel pesticide resistance management strategy on tick control in a smallholding exotic-breed dairy herd in Kenya. 2005; 37:469-478.
17. Kunz SE, Kemp DH. Insecticides and acaricides: resistance and environmental impact. Revue scientifique et technique International Office of Epizootics. 1994; 13(4):1249-1286.
18. Nawrot J, Harmatha J. Natural products as antifidents against stored products insects. Postharvest News Information. 1994; 5:17-21.
19. Negahban M, Moharramipour S, Sefidkon F. Chemical composition and insecticidal activity of *Artemisia scoparia* essential oil against three coleopteran stored-product insects. Journal of Asia Pacific Entomology. 2006; 9:381-388.
20. Negahban M, Moharramipour S, Sefidkon F. Fumigant toxicity of essential oil from *Artemisia sieberi* Besser against three stored-product insects. Journal of Stored Product Research. 2007; 43:123-128.
21. Pare PW, Tumlinson JH. Plant volatiles as a defence against insect herbivores. Plant Physiology. 1999; 121:325-331.
22. Rajput ZI, Hu S, Chen W, Arijo AG, Xiao C. Importance of ticks and their chemical and immunological control in livestock. Journal of Zhejiang University Science. 2006; 7(11):912-921.
23. Solomon KR. Acaricide resistance in ticks. Advances in Veterinary Science and Comparative Medicine. 1983; 27:273-296.
24. Sonenshine ED. Biology of Ticks. New York, NY, USA: Oxford University Press. 1991; 1:445.
25. Tvedten S. The best control for ticks, mites, mold and fungi. Chapter 20, 2016, 34. (Retrieved from https://www.yumpu.com/en/document/view/49510864/chapter-20-the-best-control-for-ticks-mites-mold-and-fungi).
26. Vietmeyer ND. Neem: a tree for solving global problems. *In*: Report of an ad hoc panel of the Board on Science and Technology for International development. National Research, National Academy Press Washington, DC, USA, 1992, 141.
27. Zewdie S. Control of external parasites of Sheep and Goats. Technical Bulletin No. 41. Published by Ethiopia Sheep and Goat Productivity Improvement Program, 2010, 16.
    Retrieved from
    http://www.esgpip.org/pdf/Technical%20Bulletin%20No.41.pdf).