

Recovery Rates, Feeding and Detachment Periods of *Amblyomma lepidum* (Acari: Ixodidae) engorged on Sheep Under Field Conditions.

Mohammed, A. S¹.; Khitma H. Almalik² and Hassan, S. M³.

(1) Central Veterinary Research Laboratories, P.O. Box 8067, (Al Amarat), Khartoum, Sudan. Fax +249 – 83 - 380011. E-mail ali_siddig@hotmail.com

(2) Department of Preventive Medicine, Faculty of Veterinary Medicine, University of Khartoum, P.O. Box 32, Khartoum North, Sudan.

(3) Department of Parasitology, Faculty of Veterinary Medicine, University of Khartoum, P.O. Box 32, Khartoum North, Sudan.

ملخص البحث

أوضحت نتائج هذه الدراسة أن متوسط نسبة إسترجاع قرادة *Amblyomma lepidum* يزداد زيادة معنوية ($P < 0.05$) من اليرقة الى الحورية إلى الطور البالغ (أناث) حيث تراوحت النسبة بين 30.7% الى 51.3% لليرقات و 60% الى 79% للحوريات و 90% الى 100% فى الطور البالغ (اناث) ، أما الفرق فى متوسط نسبة الإسترجاع بين الحيوانات الفردية فلم يكن ذا أثر إحصائى معنوى.

كان تأثير الموسمية ملحوظا فقط فى حالة الحوريات فى فصل الشتاء حيث كان متوسط نسبة الأسترجاع أقل مقارنة بالفصلين الآخرين. ولقد وجد أن فترة تغذية الطور البالغ أطول بقليل عن الطورين الآخرين. أما سقوط القراد فقد إكتمل فى كل الأطوار فى حدود يومين فيماعدًا حالتين حيث أستكمل سقوط الطور البالغ (أناث) فى ثلاثة أيام.

Summary

The recovery rates of the tick *Amblyomma lepidum* were found to increase significantly ($P < 0.05$) from larvae to nymphs to adults, where they ranged between 30.7% to 51.3 %, 60% to 79 % and 90% to 100% for larvae, nymphs and adult females, respectively. No significant difference ($P > 0.05$) was detected within individual animals for all stages. The effect of season was only noticed in case of nymphs during the cool-dry season when fewer nymphs were recovered compared to the other two seasons. The feeding period of the adult stage was slightly longer than those of larvae and nymphs. Detachment of all stages was accomplished within two days except on two occasions when female ticks took up to three days.

Introduction

Animals in the Blue Nile State of the Sudan, suffer from high tick infestation. Our close observation revealed that *Amblyomma lepidum*

predominates. According to Latif and Hassan (1997) fundamental tick ecological data such as distribution, seasonality and population dynamics are lacking. Data on the ecology and biology of the tick *A. lepidum* in the Sudan is scarce. Its ecology and host relationship were studied by Karrar *et al.* (1963) and it was incriminated on circumstantial evidence as a vector of heartwater (Karrar, 1960). Land use manipulation, change in global climate and increased animal population prompted additional investigations on the biology of this tick species.

The present study was carried out in Damazin District, Blue Nile State, where *A. lepidum* predominates to determine the recovery rates, feeding and detachment periods as contributing factors to pasture infestation.

Materials and Methods

Larvae, nymphs and adult stages of the tick *A. lepidum* were allowed to feed on 3-8 month-old Watish sheep purchased from the Damazine local animals market. Prior to the feeding, all visible ticks were manually removed and the animals were kept in tick-proof pens. White cotton bags (Bailey, 1960) were fixed at the base of the ear and scrotum. Larvae were allowed to feed on the ears, while nymphs and adults were fed on the scrotum. Each sheep was infested by 1000 larvae, 300 nymphs and 20 male and 20 female ticks, all were about two weeks old. The free ends of the bags were compactly closed by rubber bands. On the second day of application, the bags were opened to monitor the success of attachment. The animals were then let out to graze freely and observed daily till the fourth day when they were subjected to inspection for detached ticks which were collected every two hours till detachment of all the ticks. Ticks were then counted according to stages and recorded. The study was carried out in the wet, cool-dry and hot-dry seasons represented by July, December and April, respectively, for two consecutive years. Analysis of variance (ANOVA) was performed to verify the results.

Results

The average recovery rates of different stages of the tick *A. lepidum* in different seasons of the year are shown in Fig. 1. Within the individual animals, the larval recovery rate ranged between 31.6% and 38.6 % of the larvae applied except on one occasion when about 50% of larvae were recovered. The rate of recovery of nymphs ranged between 60% - 80%, while that of females was 90% – 100%. The average larval

recovery rates were 35.4% (34.5%, 36.4%), 38% (38.6%, 37.4%) and 36.4% (40.1%, 32.8%) during the wet, cool-dry and hot-dry seasons of the two consecutive years of the study, respectively. The average recovery of nymphs in the same periods were 76.4% (79.4%, 73.9%), 61.8% (62.3%, 61.3%) and 74.6% (75.3%, 73.9%). Those of females were 94.2% (96.7%, 91.7%), 88.3% (93.3%, 83.3%) and 93.3% (93.3% in both years).

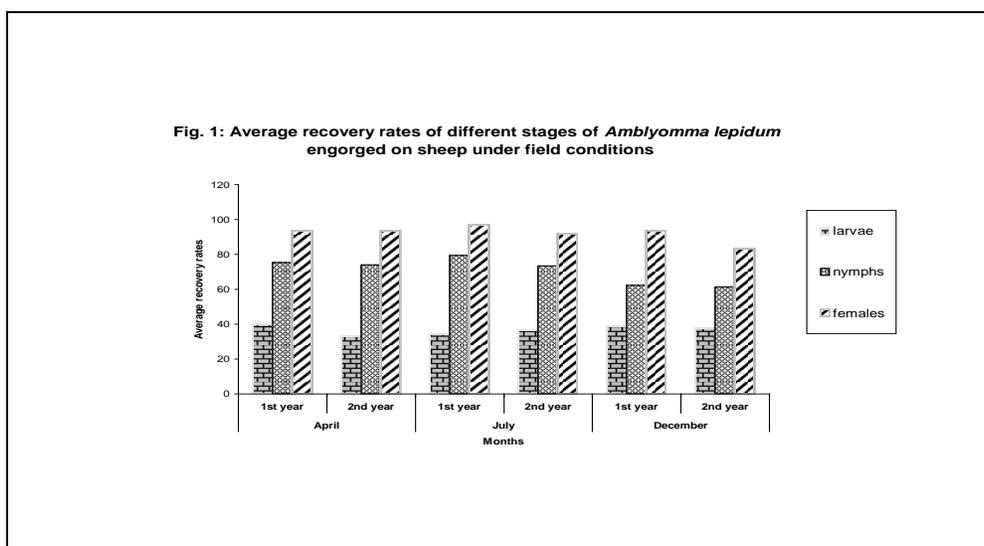


Fig. 1: Average recovery rates of different stages of *A. lepidum* engorged on sheep under field conditions in Damazine District, Blue Nile State.

The feeding period ranged between 7-8 (rarely 9 days), 7-9 days and 7-10 days for larvae, nymphs and females, respectively. The detachment of all the tick stages was accomplished in two days except on two occasions in the wet and the hot-dry seasons of the first year of the study when female ticks took up to three days to complete detachment.

Discussion

The rate of recovery increased significantly ($P < 0.05$) from the larvae to nymphs to females, but no significant difference was detected within individual animals for the same stages. The low rate of larval recovery might be attributed to many factors including the weak mouth parts that seem to reduce the ability to penetrate the skin, meager food reserve, high susceptibility to change in the environment of emerging larvae and competition. It is noteworthy that nymphs of *A. lepidum* behaved differently from the other two stages where, in cool-dry season, there was 12% to 17% reduction in the recovery rate of nymphs compared to the other seasons. Some physiological factors may be in concern. However, the same phenomenon was reported in a drop off study on the same tick species (Mohammed *et al.*, 2005). Therefore, more studies on the behaviour of the nymphs of this tick are required to delineate the factor(s) responsible for this phenomenon.

The feeding period of larvae and nymphs ranged between seven to eight and rarely nine days. Karrar (1968) reported six to seven days for the larval feeding, while Yassir *et al.* (1992) reported four to six days. The results of the current study, however, are within the range obtained by Guglielmone and Moorhouse (1985) who have found that the feeding period of larvae and nymph of *A. triguttatum*, ranged between 6 and 11 days with an average of seven days.

The detachment of all stages was completed in two days, except on two occasions when the females took up to three days. These findings are in agreement with the results obtained by Du Toit *et al.* (1994).

Acknowledgements

The authors wish to express their great gratitude to the Director General of Animal Resources Research Corporation for permission to publish this work. Our thanks are also extended to Prof Osman, A.Y and Dr. El Amin, E. D. M. for critical review of the manuscript.

References

- Bailey, K. P. (1960). *Bull. Epiz. Dis. Afri.* **8**: 33 - 43.
- Du Toit, J.; Fourie, L. J. and Hourak, I. G. (1994). *Vet. Res.* **61**: 149 - 153.
- Guglielmone, A. A. and Moorhouse, D. E. (1985). *Acarologia.* **26**:123-129.
- Karrar, G. (1960). *Br. Vet. J.* **116**: 105 - 114.

- Karrar, G. (1968).** *Sud. J. Vet. Sc. Anim. Husb.* **9**(1): 328-343.
- Karrar, G.; Kaiser, M. N. and Hoogstraal, H. (1963).** *Bull. Entomol. Res.* **54**: 509-522.
- Latif, A. A. and Hassan, S. M. (1997).** *Proceedings of International workshop held at ICIPE, Nairobi, Kenya, 9-19 September.*
- Mohammed A. S.; El Malik Khitma H. and Hassan, S. M. (2005).** *Exp. Appl. Acarol.* **36**: 225-232.
- Yassir, O. M; Osman, O. M and El Amin, T. H. (1992).** *Ins. Sci. Appl.* **13** (4): 565-568.