



IXC2

Medical And Veterinary Entomology

TOXICOLOGICAL INVESTIGATIONS OF THE FAILURE OF PYRETHROIDS TO CONTROL THE SHEEP BODY LOUSE, *DAMALINIA OVIS* (SCHRANK) (PHTHIRAPTERA: TRICHOECTIDAE). G.W. Levot and P.B. Hughes\*, Department of Agriculture, New South Wales, P.M.B. 10, Rydalmere, N.S.W. 2116, Australia.

Pour-on formulations of synthetic pyrethroids have been used to eradicate *D. ovis* on sheep in Australia since 1981. By 1986 resistance was suspected as a reason for control failures. A laboratory bioassay was developed in which lice were exposed for 16 hours on insecticide-impregnated cotton gauze. Considerable variation in response to the pyrethroids was evident, with a 10x difference in LC50 between the most susceptible strain and the more resistant ones which had survived several pyrethroid treatments in the field. There was no apparent cross-resistance to the organophosphate diazinon. Regular use of pour-on treatments has probably selected the most resistant individuals within populations. When these individuals predominate, it is sufficient to form detectable infestations of lice on sheep soon after treatment. The emergence of this resistance has stimulated a reappraisal of methods for lice control which will be discussed in terms of the traditional attitudes to the problem of lice on sheep in Australia.

HOST RESISTANCE TO THE HUMAN BODY LOUSE (*PEDICULUS HUMANUS*) INDUCED BY IMMUNIZATION WITH LOUSE EXTRACTS. D. Ben-Yakir\* and Y.K. Mumcuoglu, Department of Parasitology Hebrew University - Hadassah Medical School, P.O.B. 1172, Jerusalem 91010, Israel.

The possibility of inducing host resistance to lice by immunization with louse tissue extracts was investigated. A laboratory colony of the human body louse, adapted to feed on rabbits, was used. Test rabbits were immunized with an extract of a homogenate of either the whole body or the midgut tissue of the louse; controls, with either ovalbumin or saline. Test rabbits developed high titers of anti-louse antibodies. A group starting with 500 lice, including all active stages, was reared for 2 weeks on each of the rabbits. Lice that fed on the immunized rabbits took significantly smaller blood meals than those on control rabbits. The rate of development and fecundity were lower and mortality was higher in lice reared on the test rabbits. Lice reared on rabbits immunized with midgut extract suffered a greater damage and many of them died as a result of a ruptured gut.

The immuno-blotting technique was used to identify immunogenic proteins in louse extracts, using sera from test rabbits.

SEX PHEROMONE IN THE TICK *ORNITHODOROS SAVIGNYI* (ACARI: ARGASIDAE). G.M. Khalil\*, A.S. Marzouk, M.A. Roshdy and F.S.A. Mohamed, Department of Zoology, Faculty of Science, Qatar University, Doha, Qatar.

Bioassays performed on *O. Savignyi* demonstrated the presence of a female sex pheromone. Unfed adults and fed adults, after various postfeeding periods, were cross-tested. Two independent criteria were used, the percentage of positive male responses and the time elapsed before these responses. Females were least attractive when unfed and on the feeding day. Their attractiveness increased afterwards reaching the highest values 6 days postfeeding (most attractive, MA, females) then decreased gradually thereafter. Males were least responsive during the first 2 postfeeding days and became more responsive afterwards reaching a peak 8 days postfeeding (sexually active, SA, males). Unfed male responses to MA females were strong but were lower than those of SA males. The fastest responses in all bioassays were those of SA males to MA females. The maximum range of SA male response to MA females was ca 9 cm. SA males were not attracted to nymphs, MA females with sealed coxal orifice or MA dead females. However, they responded to nymphs coated with coxal fluid collected from MA females.

HOST ASSOCIATIONS AND SEASONAL ACTIVITY OF TICK VECTORS OF CRIMEAN-CONGO HEMORRHAGIC FEVER VIRUS IN SENEGAL. Mark L. Wilson\*, Jean-Louis Camicas, Jean-Paul Cornet. Institut Pasteur, B.P.220, Dakar, Senegal.

At least 28 species of Acari, mostly "hard" ticks, are able to support infection by Crimean-Congo Hemorrhagic Fever virus (CCHFV), a zoonotic disease agent that is focally enzootic throughout Africa and southern Eurasia. Both the virus and its potential vectors (*Hyalomma*, *Amblyomma*, and *Rhipicephalus* species) occur in western Africa. As part of a multifaceted project on the ecology and epizootiology of this human zoonosis, we analysed the host feeding patterns and seasonal activities of certain of these ticks. Domestic ungulates, small mammals, and birds were examined monthly and relative attachment rates were calculated. Questing tick activity was monitored by flagging. The quantitative importance of these hosts to tick population dynamics and maintenance of virus transmission was analysed. Results are evaluated in the context of intervention designed to decrease transmission and reduce the risk of human disease.

COMPLEX MULTICOMPONENT PHEROMONE SYSTEMS REGULATING MATE RECOGNITION AND SPECIES DISCRIMINATION IN IXODID TICKS. D.E. Sonenshine\*, S.A. Allan, J.G.C. Hamilton, D. Taylor, J.S. Phillips and R.M. Silverstein. Department of Biological Sciences, Old Dominion University, Norfolk, Virginia, USA 23529 and Department of Chemistry, College of Environmental Sciences and Forestry, State University of New York, Syracuse, New York, USA 13210.

Mate recognition in ixodid ticks is regulated by sex pheromones. In most metastriate species, feeding females secrete 2,6-dichlorophenol to attract males. In many species, females also secrete a mounting sex pheromone (MSP) which enables males to recognize them as mates and search for the genital pore. Differences in the MSP deter most intergeneric matings but these differences are less effective in deterring interspecific encounters. In *Dermacentor variabilis* and *D. andersoni*, males identify conspecific females when they recognize the species-specific genital sex pheromones (GSP) in the genital pore. A mixture of C14-C18 free fatty acids in the vaginal tract and on the external ventral body surface serves as a component of the GSP in these species. Natural differences in fatty acid concentration in *D. variabilis* and *D. andersoni* may be one of the factors facilitating mate recognition at the species level. The role of GSP in other genera, is being studied. The identity of the MSP is unknown.

USE OF AQUATIC INSECTS IN DETERMINING SUBMERSION INTERVALS OF CORPSES. N.H. Haskell\*, D. G. McShaffrey, and R.E. Williams, Department of Entomology, Purdue University, West Lafayette, Indiana 47907.

The use of aquatic insects in determining submersion intervals at death scene investigations has not been exploited in the past, although great potential exists. Aquatic environments have no true specific indicator species as do terrestrial habitats. However, aquatic environmental studies show that organisms may colonize a substrate dependent on factors such as size, position, exposure to current, water temperature, current speed, water depth, the presence of algal communities, or detritus. Certain aquatic insects such as the chironomid midges (Diptera, Chironomidae), and the caddisflies (Trichoptera), are capable of colonizing emersed bodies; and with the known biology of a specific species of insect for a certain geographic area, time intervals of immersion can be established.

During preliminary examination of the body of a homicide victim found in central Indiana, a peculiar red "fiber" was noticed and recovered. Initially believing this to be a carpet fiber, the item was subjected to fiber analysis. It was found to be a short coiled particle not like any known natural or synthetic fabric fiber. Subsequent examinations determined this "fiber" to be the larva of a common fresh water midge, Chironomidae. It is very important that forensic pathologists and other forensic scientists consult with the entomologists to insure that vital crime scene evidence is recognized and properly identified, to gain the greatest potential from that evidence.



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