

The table shows some interesting age-parasite relationships. There is a tendency for the fawn-yearling class to have a greater number of ectoparasitic infestations and less endoparasitic infestations than the adults. This was observed by Olsen and Fenstermacher (1943) in white-tailed deer (*Odocoileus virginianus*) they also observed the tendency for sucking lice to be found only on young deer. This feature was observed in the present study, the sucking louse *Solenopotes burmeisteri* occurring on two fawns, no infestation of adult hosts being recorded.

The most common ectoparasite, as shown by the table, appears to be *Damalinea longicornis*. The commonest helminths are *Oesphagostomum venulosum*, *Spiculopteria böhmi* and *S. asymmetrica*, in that order. It is interesting to note that these nematodes are among the least harmful to red deer. This is to be expected as it is an advantage for a parasite to have as little effect on the host as possible so as to avoid host reaction or death of the host.

The intensity of infestation varied considerably, from host to host and species to species, but it was found that hosts from the same area generally carried a similar parasitic fauna of similar density. Populations of endoparasites were rarely found to be high, although there was often a variety of species in one host. Ectoparasites were often found in very large numbers, but mainly on young animals, often covering a large part of the host body. In older host animals the ectoparasite populations tended to become smaller and more localised on the host.

DISTRIBUTION

With the possible exception of *Rinadia quadrifurcata*, *Ostertagia leptospicularis*, *S. monodigitata* and *Haemaphysalis bispinosa*, the parasites of red deer described above have a reasonably wide distribution in both the North and South Islands of New Zealand. Some are of patchy occurrence, such as the liver fluke (*Fasciola hepatica*) which is dependent on the distribution of its intermediate host; and the lungworm (*Dictyocaulus viviparus*) whose infective larva relies on a damp, cool environment. Some of the apparently rarer parasites such as *Trichuris ovis* are common throughout New Zealand in farm animals, and it is from this source that the red deer can become infected. The limited distribution of *Rinadia quadrifurcata* and *S. monodigitata* cannot be easily explained, but the small numbers of these worms suggest incidental infection from another host, and presence in the same area of other feral mammals such as wapiti and chamois is evidence in favour of this theory. The distribution of *Haemaphysalis bispinosa* is limited by climatic conditions and is restricted mainly to the northern half of the North Island, in an area which overlaps the range of the red deer. The biting louse *Damalinea longicornis* would have a distribution similar to red deer as it is extremely host specific.

Affinities of the red deer parasites.

(a) *With domestic animal parasites.* Red deer have a range that often includes farmland and high country areas grazed by sheep, cattle and goats. Where red deer and these domestic animals have common parasites, the former may act as a wild host reservoir. Two facts must be emphasised, however; first, infected domestic animals must be present on the pastures to deposit the worm eggs and larvae; and secondly, the deer must feed on the grass in such areas. The red deer having become infected with the domestic stock parasites, the possibility now arises that the parasites may become adapted over many generations, to the red deer—i.e., a "biological race" might form. Baker, Longhurst and Douglas (1957) record some parasite population reduction on change of host species. However, should this race preference occur, it would be expected that there would be only a reduction in parasite numbers, not a refusal of one host to accept the parasites of another.