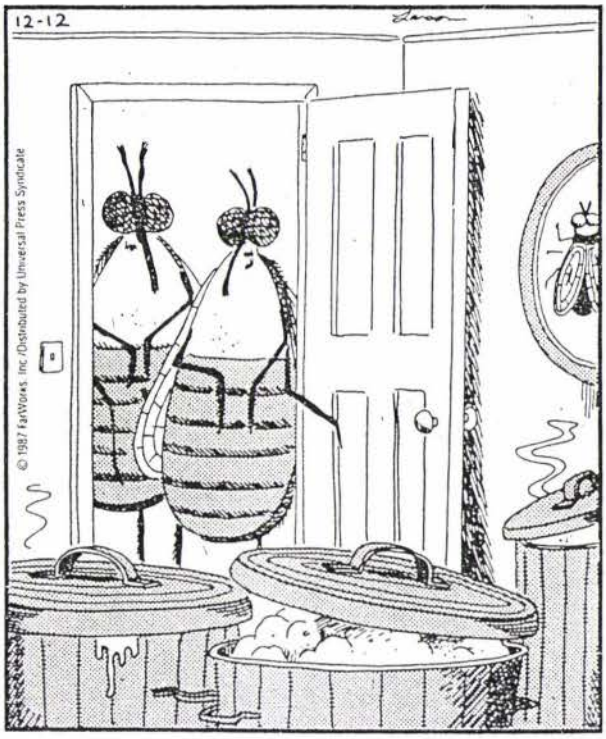

"And when the big moment comes,
here's the nursery Robert and I have fixed up."

FRONT PIECE.

HABITAT AND SEASONAL EFFECTS ON BLOWFLY ECOLOGY IN POSSUM CARCASES IN THE MANAWATU.

A thesis presented in partial fulfilment for the
requirements for the degree of Master of Science
in Ecology at Massey University.

Clive Appleton

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ABSTRACT.

Flies were trapped on Keeble farm and in Keeble forest reserve between May 1992 to February 1993. Fewer Calliphoridae were trapped in pasture during summer than in autumn or winter and different fly species showed differing preferences for bush or pasture at different times of the year. More flies were trapped around the bush margin than in either bush or pasture during spring and summer. In pasture the most numerous calliphorid trapped was *Calliphora stygia* (Fabricius, 1781), whereas in bush during summer *Calliphora hilli* Patton, 1925 was the predominant species. *Lucilia sericata* (Meigen, 1826) was never trapped in bush.

Decaying possum carcases were examined in bush and pasture between February 1992 and February 1993. The number of maggots that left these carcases was affected by the time of the year and whether the carcases were in bush or pasture. More maggots left bush located possum carcases during spring and summer while more maggots left possum carcases in pasture during autumn and winter. Decay rates were most rapid during spring and summer. Temperatures were warm enough for adult fly activity during winter but the possum carcases decayed much slower, especially in bush.

C. stygia and *Calliphora vicina* Robineau-Desvoidy, 1830 were generally the first species of maggot to leave possum carcases and they were the only species present throughout the year in both habitats. *L. sericata* and *Chrysomya ruficacies* (Macquart, 1843) maggots were restricted to possum carcases in pasture during spring and summer while *Calliphoroides antennatis* (Hutton, 1881) was restricted to possum carcases in bush. *Hydrotaea rostrata* Robineau-Desvoidy, 1830 was the only species restricted to summer.

In spring 1992, 3400 flies emerged from a 2.5 kg possum carcase placed in pasture and 4200 flies emerged from a 3.1 kg possum carcase placed in bush. Estimated emergence success of adult flies was 22.0% in pasture and 20.2% in bush. This was 15% lower on average than the emergence level of comparable maggots raised in the laboratory. Flies began emerging in the bush 10 days after those in pasture. *L. sericata* was restricted to pasture and *C. antennatis* was restricted to bush. Overall the major flystrike species to emerge were *C. stygia* and *L. sericata*. *C. stygia* made

stygia made up 46% of the total number of flies that emerged in pasture and 78% of those in bush, while *L. sericata* comprised 15.5% of the total number of flies that emerged in pasture.

The emergence success of field-collected maggots in the laboratory was significantly correlated with the estimated average total number of maggots that left the carcases in the field. Maggots showed the highest emergence success in winter when larval competition in the carcase was lowest.

The temperature of a possum carcase containing fly maggots in bush reached 19.7°C during spring 1992 whereas the temperature exceeded 35°C on occasions in another carcase in pasture at the same time. Proportionally fewer maggots emerged from the possum carcase in pasture possibly because the high temperatures killed many maggots, especially those of *C. stygia.*

Maggots and bacterial decay both elevated carcase temperatures above ambient. Bacteria raised the temperature by about 2°C whereas maggots raised the temperature by 18.3°C to 26°C above ambient. The carcase temperature significantly affected the number of maggots that left the possum carcases, and the number of maggots that left was directly related to the total maggot biomass that left the carcase. A minimum of 24% to 26% of the fresh weight of the possum carcases was converted to maggot weight.

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