INSECTS AND MITES ASSOCIATED WITH FRESH CATTLE DUNG IN THE SOUTHERN INTERIOR OF BRITISH COLUMBIA

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ABSTRACT

Sixty-seven species or genera of insects were found associated with fresh cattle dung in the Southern Interior of British Columbia. Three species of mites were associated with two of the insect species. About one-half of the species of Coleoptera and Diptera concerned are known or thought to be introduced.

Introduction

Cattle dung does not decompose quickly in the semi-arid rangelands of the southern Interior of British Columbia. Dried dung pads usually remain on the soil for long periods. While the dung is fresh it is a food and rearing medium for the larvae of two dipterous pests of cattle: the horn fly and the face fly. Later, the dried pads clutter rangeland and pastures as a store of undecomposed plant nutrients.

Insects have been the most successful group in exploiting animal dung in various ways, and they range from the truly coprophagous forms such as muscoid flies and dung beetles (Scarabaeidae) to the predators and parasites that prey upon many of the coprophages. It is possible and desirable to manipulate the insect fauna of dung through the careful introduction of certain insect species. These will suppress noxious species such as the horn fly (Macqueen and Beirne in prep.) and will help to bury the dung (Macqueen and Beirne in prep.).

Methods

During the summer of 1970 dung insects were collected by hand in the Kamloops and Summerland areas of British Columbia. In 1971 and 1972, as an off-shoot of field investigations into the production of horn fly from naturally-dropped cattle dung pads (Macqueen and Beirne in prep.) on irrigated pasture, insects were bred from pads that had been exposed in the field for 24 hours and then were removed to individual emergence cages in a greenhouse.

Results

A large number of dung insects emerged from the samples collected in the field. A few species in addition to these were taken during other field work. Table 1 lists these insects. The collection is not exhaustive because this investigation was mainly concerned with certain types of insects that breed in the dung, namely:

—prevalent coprophagous species that might be important basic units in food chains within the pads and which, along with the horn fly, are probably inhabitants only of fresh dung;

—predaceous and parasitic insects that prey on the coprophagous species;

—species that manipulate the dung mass (Scarabaeidae: Aphodiinae and Scarabaeinae).

Some species that actually breed in dung may have been omitted because of their erratic occurrence or low numbers, but it is highly unlikely that any moderately prevalent dung-breeding species are not included.

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Table. 1. Insects associated with fresh cattle dung on range and irrigated pastures at Kamloops, B.C., 1970-72.

SPECIES	AUTHORITY*	ORIGIN
ORDER COLEOPTERA		
Histeridae		
Hister abbreviatus F.	3	Native?
Saprinus lubricus Lec.	3	Native?
Saprinus oregonensis Hatch	3	Native
Margarinotus umbrosus Casey	3	Native
Hydrophilidae		
Cercyon spp.	11	
Sphaeridium bipustulatum F.	11	Exotic
Sphaeridium lunatum F.	11	Exotic
Sphaeridium scarabaeoides L.	11	Exotic
Scarabaeidae		
Boreocanthon simplex (Lec.)	2	Native
Onthophagus nuchicornis (L.)	2	Exotic
Aphodius fossor (L.)	2	Exotic
Aphodius fimetaruis (L.)	2	Exotic
Aphodius congregatus Mann.	1	Native
Aphodius distinctus (Muell.)	1	Exotic
Aphodius granarius (L.)	1	Exotic
Aphodius haemorrhoidalis (L.)	1	Exotic
Aphodius pectoralis Lec.	1	Native
Aphodius tenellus Say	1	Native
Aphodius vittatus Say	1	Native
Staphylinidae		
Aleochara bimaculata Grav.	3	Exotic
Hyponygrus obsidianus Melsh.	3	Native?
Ontholestes cingulatus Grav.	3	Native
Philonthus cruentatus Gmelin	3	Exotic
Philonthus debilis Grav.	3	Exotic
Philonthus fuscipennis Mann.	3	Exotic
Philonthus rectangulus Sharp	3	Exotic
****Philonthus sanguinolentus** Grav.	3	Exotic
Platystethus americanus Erich.	3	Native
Tachinus nigricornis Mann.	3	Native
ORDER DIPTERA		
Ceratopogonidae		
Forcipomyia brevipennis (Macquart)	5	?
Stratiomyidae		
Sargus cuprarius (L.)	10	Exotic
Microchrysa flavicornis (Meig.)	10	Native
Otitidae		
Physiphora demandata (F.)	6	?

**First record of this species in Canada.

SPECIES	AUTHORITY*	ORIGIN
Sphaeroceridae		
Copromyza atra (Meig.)	13	?
Leptocera spp.	13	
Sepsidae		
Sepsis neocynipsea Mel. & Spul.	6	?
Saltella sphondylii (Schr.)	6	?
Anthomyiidae		
Calythea micropteryx (Thoms.)	6	Native
Scatophagidae		
Scatophaga furcata (Say)	14	Native
Scatophaga stercoraria (L.)	14	Exotic?
Muscidae		
Haematobia irritans (L.)	14	Exotic
Helina duplicata (Meig.)	14	Exotic
Hydrotaea armipes (Fall.)	14	Exotic?
Morellia micans (Macquart)	14	Native
Myospila meditabunda (F.)	14	Exotic
Musca autumnalis DeGeer	14	Exotic
Musca domestica (L.)	16	Exotic?
Orthellia caesarion (Meig.)	14	Exotic?
Pyrellia cyanicolor (Zett.)	14	Native?
Pegomya spp.	6	
Calliphoridae		
Eucalliphora lilaea (Walk.)	4	Native
Phormia regina (Meig.)	4	Exotic?
Sarcophagidae		
Ravinia l'herminieri (Rob.-Desv.)	4	Native
Ravinia planifrons (Ald.)	12	Native
Ravinia querula (Walk.)	4	Native
ORDER HYMENOPTERA		
Braconidae		
Aphaereta pallipes (Say)	9	Native
Trichopria (subg. **Phaenopria**): 2 spp.	8	
Asobara n. sp.	9	
Cynipidae		
Kleidotoma fossa Kieff.	15	Native?
Figitidae		
Figites n. sp.?	15	
Xyalophora quinquelineata (Say)	15	Native?
Melanips ? **bilineatus** (Kieff.)	15	
Pteromalidae		
Muscidifurax raptor Gir. & Saund.	15	?
Muscidifurax zaraptor Kogan & Legner	15	Native
Spalangia haematobiae Ashm.	15	Native
ORDER ACARINA		
Pyemotidae (Pygmephorini)		
Pediculaster mesembrinae (R. Can.) (associated with **Haematobia irritans** (L.))	7	

SPECIES	AUTHORITY*	ORIGIN
Parasitidae		
Parasitus sp. (associated with **Aphodius fossor** (L.))	7	
Macrochelidae		
Macrocheles glaber group: sp. near **Perglaber** Fil. & Peg. (associated with **Aphodius fossor** (L.))	7	

*Insects were identified by (1) H. F. Howden, Department of Biology, Carleton University, Ottawa; and the following members of the Taxonomy Section, Entomology Research Institute, Agriculture Canada, Ottawa: (2) E. C. Becker; (3) J. M. Campbell; (4) B. Cooper; (5) L. Foster; (6) J. F. McAlpine; (7) E. E. Lindquist; (8) L. Masner; (9) W. R. Mason; (10) B. V. Peterson; (11) R. de Ruette; (12) G. E. Shewell; (13) H. J. Teskey; (14) J. R. Vockeroth; and (15) C. M. Yoshimoto; and also (16) the senior author.

Where possible, the geographical origin of each species was determined, either from the literature or from the authority responsible for the identification. Species are designated as exotic if there is documentation that they were introduced into North America since the arrival of the Europeans and native if it is considered that they have a natural Nearctic distribution. For many species that currently have a Holarctic distribution, it is impossible to determine an area of origin with certainty. These have a question mark (?) in the column designating their origin in Table 1. If there is some, but not definitive, evidence for a certain origin of these Holarctic species, the question mark appears after the possible origin.

Discussion

Coffey (1966) and Poorbaugh, Anderson, and Burger (1968) gave extensive lists of flies and other insects associated with cattle dung in southeastern Washington and in California, respectively. These authors collected flies that were attracted to dung, as well as those reared from it. It is likely that some of the species they mention are present at Kamloops but are not listed here because they do not breed in the dung.

Nearly half of the species in Table 1 were introduced accidentally from Europe or Asia: thirteen of the species of Coleoptera listed are known as probably native whereas 15 are known as probably exotic; the corresponding figures for Diptera are 9 and 10 and for the Hymenoptera 5 and 0. Lindroth (1957) recognized the European origin of a number of insects associated with cattle dung on the east coast of North America. Most have spread across the continent to the west coast (Poorbaugh *et al.* 1968), although there have been occasional separate introductions into the West as in the case of the dung beetle, *Onthophagus nuchicornis* (L.) (Howden and Cartwright 1963; Howden 1966). The British Columbian dung fauna is essentially very similar to that listed for California by Poorbaugh *et al.* (1968). Comparison of the west coast fauna with that associated with cattle dung in Indiana (Sanders and Dobson 1966) and Texas (Blume 1970) shows differences mainly in the Coleoptera.

The general spread of cattle throughout much of North America has afforded a means for establishment of many introduced bucoprophilous species, i.e., those attracted to cattle dung, and may have enabled

some indigenous species to expand their original ranges. The result is that there is now a diverse dung fauna in the Southern Interior. The original coprophilous fauna in the area may have consisted of relatively few species. Many of the introduced insects that undoubtedly coexisted in Europe are now reunited under somewhat different circumstances. Some are known predators and parasites of the horn fly and the face fly. It is fortunate that the same imperfect quarantine precautions which permitted those pest flies to enter North America has also tempered their economic impact by also allowing the introduction of some of their natural enemies.

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