XIII. PATHOGENS OF *STOMOXYS CALCITRANS* (STABLE FLIES)[a]

Bernard Greenberg

Professor of Biological Sciences
University of Illinois at Chicago Circle
Chicago, IL 60680, USA

a The author thanks Vijtas Bindokas for help in gathering the information for this table.

PATHOGENS OF *STOMOXYS CALCITRANS* (STABLE FLIES)

Host	Host stage infected	Pathogen	% Incidence	Locality	Lab. or field study	Reference
Stomoxys calcitrans	Larvae	*Cillopasteurella delendae-muscae* (Roubaud & Descazeaux) Prévot (=*Bacterium delendae-muscae*)	--	France	Lab., field	Roubaud & Descazeaux (1923)
"	Adults	*Brucella* (=*Micrococcus*) *melitensis* (Hughes) Meyer & Shaw	0	Malta	Lab.	Kennedy (1906)
"	Larvae	*Bacillus thuringiensis* var. *thuringiensis* Heimpel & Angus	Bioferm LD_{50} ~150 mg/100 g faeces Bakthane LD_{50} ~200 mg/100 g faeces Biotrol LD_{50} ~1000 mg/100 g faeces	Texas	Lab.	Gingrich (1965)
"	Adults	? *Entomophthora* Fresenius	--	Dahomey	Lab., field	Roubaud (1911)
"	Larvae	*Entomophthora* (=*Empusa*) *muscae* Cohn	~25% of larvae infected died between 9 and 11 days	Sahara	Lab., field	Surcouf (1923)
"	Larvae	*Rhabditis axei* (Cobbold)	--	England	Lab.	Hague (1963)
"	Larvae, pupae, adults	*Habronema muscae* (Carter), *H. megastoma* (Rudolphi) Seurat, *H. microstoma* (Schneider)	100% induced infection with *H. microstoma*. *H. muscae* and *H. megastoma* do not develop in *S. calcitrans*	Australia	Lab.	Bull (1919)

PATHOGENS OF STOMOXYS CALCITRANS (STABLE FLIES) (continued)

Host	Host stage infected	Pathogen	% Incidence	Locality	Lab. or field study	Reference
Stomoxys calcitrans (continued)	Adults	Filaria stomoxeos (=? Habronema microstoma or ? Seteria cervi)	2 found infected out of 41 examined	--	Field	Von Linstow (1875)
"	Larvae, pupae, adults	Habronema microstoma	Among 63 flies, 10 pupae, and 12 larvae caught outdoors, only 1 adult was infected. In lab., a high % of adults could be infected in the larval stage	Australia	Lab., field	Hill (1919)
"	Adults	Habronema microstoma	Two infected out of 22 examined	Australia (Brisbane)	Lab., field	Johnston & Bancroft (1920)
"	Adults (?)	Habronema microstoma	--	Australia (Brisbane)	Lab., field	Johnston (1920)
"	Larvae, adults	Habronema microstoma	--	France	Lab.	Roubaud & Descazeaux (1922)
"	Adults (?)	Habronema muscae	--	Australia (Brisbane)	Field	Johnston (1913)
"	Adults	Microfilaria sanguinus equi africano	--	Philippines	Lab.	Mitzmain (1914)
"	Adults	Setaria cervi (Rudolphi) (=? Filaria labiato papillosa)	Only 3-4% of Stomoxys were infected in any locality despite high filarial rates in livestock	Italy	Lab., field	Noè (1913)

ABSTRACTS

Bernard Greenberg & Mary Ann Strand

Bull, L. B. (1919). A contribution to the study of habronemiasis: A clinical, pathological, and experimental investigation of a granulomatous condition of the horse - habronemic granuloma. Trans. R. Soc. S. Aust., 43: 85-141.

No mention of nematode killing fly. It is probable that heavily infected flies sicken and die sooner as noted in Musca fergusoni (Johnston and Bancroft, 1920) and Musca domestica (Patton and Cragg, 1913).

Gingrich, R. E. (1965). Bacillus thuringiensis as a feed additive to control dipterous pests of cattle. J. Econ. Entomol., 58: 363-364.

Each of three commercial preparations of B. thuringiensis was mixed with bovine faeces and also was fed directly to cattle: Haematobia irritans most susceptible; S. calcitrans most resistant; and Musca domestica, intermediate.

Hague, N. G. M. (1963). The influence of Rhabditis (Rabditella) axei (Rabditinae) on the development of Stomoxys calcitrans. Nematologica, 9: 181-184.

Nematode found in large numbers in routine cultures of the fly. Rate of emergence and number of flies emerging were decreased, thought due to competition for available food source between nematode and fly larvae, rather than pathogenicity.

Hill, G. F. (1919). Relationship of insects to parasitic diseases in stock. 1. The life history of Habronema muscae, Habronema microstoma, and Habronema megastoma. Proc. R. Soc. Victoria, n.s., 31: 11-107.

No mention of nematode killing fly.

Johnston, T. H. (1913). Notes on some Entozoa. Proc. R. Soc. Queensl., 24: 63-91.

First known isolation of larval nematode in Australia. Effect on flies not noted.

Johnston, T. H. (1920). Flies as transmitters of certain worm parasites of horses. Sci. Ind. (Melbourne), 2: 369-372.

No mention of nematode killing fly.

Johnston, T. H. & Bancroft, M. J. (1920). The life history of Habronema in relation to Musca domestica and native flies in Queensland. Proc. R. Soc. Queensl., 32: 61-88.

No mention of nematode killing fly.

Kennedy, J. C. (1906). Experiments on mosquitoes and flies. Rep. Comm. Medit. Fever. R. Soc. (London), 4: 83-84.

In a search for a vector of B. melitensis among goats, dissections of S. calcitrans which had been exposed to the pathogen and subsequent culturing of the organs revealed no Brucella.

Mitzmain, M. B. (1914). An experiment with Stomoxys calcitrans in an attempt to transmit a filaria of horses in the Philippines. Amer. J. trop. Med., 2: 759-763.

Parasitized flies suffered increased mortality during first 10 days of infection.

Noè, G. (1903). Studî sul ciclo evolutivo della Filaria labiato papillosa Alessandrini. Atti R. Accad. Lincei, Ser. 5, 12: 387-393.

S. calcitrans appears refractory to infection; flies feeding on infected bovines never had more than 3 larvae in their gut.

Patton, W. S. & Cragg, F. W. (1913). A textbook of medical entomology. Christian Literature Society for India, London, 345 p.

Roubaud, E. (1911). Etudes sur les Stomoxydes du Dahomey. Bull. Soc. Pathol. Exot., 4: 122-132.

In a limited trial, 1/5 S. calcitrans died 24 hours after ingesting Entomophthora spores.

Roubaud, E. & Descazeaux, J. (1922). Evolution de l'Habronema muscae Carter chez la mouche domestique et de l'H. microstoma Schneider chez le Stomoxe. (Note prélim.). Bull. Soc. Pathol. Exot., 15: 572-574.

No mention of nematode killing fly.

Roubaud, E. & Descazeaux, J. (1923). Sur un agent bactérien pathogène pour les mouches communes: Bacterium delendae-muscae n. sp. C. R. Hebd. Seances Acad. Sci., 177: 716-717.

Infection appeared spontaneously in laboratory rearings of the stable fly and in stable flies naturally breeding in rabbit droppings. All specimens died between 2 and 30 days after eclosion when the larvae were infected; inoculated, the organism kills flies in 18 to 24 hours. No deaths occurred in adults fed the organism, although adult house flies did die.

Surcouf, J. M. R. (1923). Deuxième note sur les conditions biologiques du Stomoxys calcitrans L. Bull. Mus. Natl. Hist. Nat. Paris, 29: 168-172.

A water solution of M. domestica which had been killed by E. muscae was sprayed on Stomoxys larvae at 23°C and high humidity. Infection established in 9 days as 23°C and high humidity; one quarter of the larvae died between the ninth and the eleventh days.

Von Linstow (1875) (See G. F. Hill)

First record in stable fly.