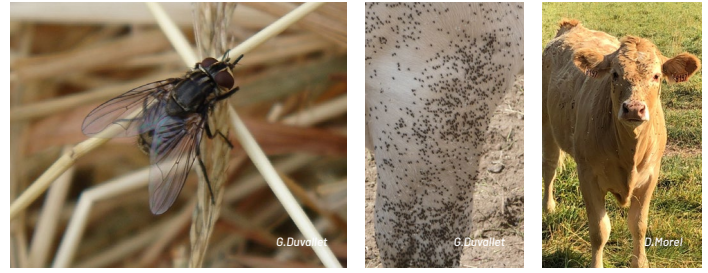


Combining natural enemies and mass trapping for stable fly management, a new IPM approach

By Gérard DUVALLET*, Damien Morel**, Elena Barrio***, Mikel Alexander González****, Ignacio Ruiz-Arrondo ***** (* Université Paul-Valéry Montpellier, ** Bestico, *** El Refugio del Burrito, **** University of the Balearic Islands, ***** Centro de Investigación Biomedica de La Rioja (CIBIR), 26006 Logrono)



Stomoxys calcitrans

Flies on cattle

Introduction

Stable flies (*Stomoxys calcitrans*) are serious livestock pests all over the world. Larvae develop in various substrates such as rotten plant material or manure. Emerged adults bite the animals and human beings for blood meals.

Costs generated by these flies within the livestock sector has been estimated at US \$ 2.2 billion/year (Taylor et al., 2012) in United States. In France, losses in the meat sector is estimated at 145 M€ per year, and in the milk sector it is rising a yearly average loss of 234 M€ (Blanc-Debrune, 2019).

These losses are due to the nuisance caused by painful bites, which prevent the animals from feeding properly and to the potential transmission of pathogens (Baldacchino et al., 2013). Blood loss can be very significant during peaks of abundance.

Chemical control by using insecticides is often used. This control method damages the environment and faces resistance problems. Resistance of flies to insecticides has been shown both phenotypically and genetically (Salem et al., 2002; Tainchum et al., 2018; Olafson et al., 2019).

Aims and Objectives

To propose an integrated pest management solution for the control of the stable fly: Using a combination of natural enemies to control immature stages and a specific trapping system for the adults.

Use of biological control agents and traps provide a safe solution for the environment and the farmer and it is easy to use. By definition, it is an integrated pest management program.



Stomoxyc® trap developed by Alcochem Hygiene. Ph. G. Duvallet



Pteromalidae mini wasp laying eggs in a fly pupa.

Macrocheles robustulus eating fly eggs.

Methodology

Trap STOMOXYCC® from the company ALCOCHEM / ABIOTEC is used for mass trapping of adult *Stomoxys*. (<https://stomoxys.com>) (Duvallet, 2022).



2 traps on a neighbouring farm as control

19 traps on the Refugio

Example of implementation of traps in a large donkey farm in Spain (El Refugio del Burrito)

Use of natural enemies BIOMITE & BIOWASP containing respectively the predatory mite *Macrocheles robustulus* and 2 parasitoid species *Spalangia cameroni* and *Muscidifurax raptor*. Both predators and parasitoids are released monthly on animal beddings.

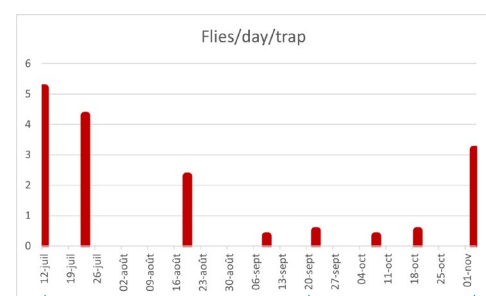


The predatory mites and the parasitoids will feed on and parasite stable fly eggs and pupae, respectively.

These beneficials are provided by BESTICO a Koppert company (<https://bestico.fr>) dedicated to biological control in livestock.

Results / Findings

First preliminary results after implementation of the IPM in July 2022.



Implementation of IPM end of June

Release of beneficials stopped mid-September

New punctual release of beneficials

Discussion / Conclusion

Preliminary results will be available in 2023 on the next fly season. Control of stable flies without the use of insecticides. Necessity to associate trapping of adult flies, and biocontrol of eggs and larval stages. Do not forget also that a good management of effluents is absolutely necessary in the farms.

Bibliography:

on demand to : gerard.duvallet@univ-montp3.fr

Acknowledgements:

Alcochem Hygiene, Nijkerk, Netherlands
Abiotec, Le Plessis-Robinson, France

