



Department of
**Primary Industries and
Regional Development**

SPALANGIA WASP ASSESSMENT AGAINST STABLE FLIES

GINGIN CATTLE FEEDLOTS, 2016

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Fig. 1. *Spalangia endius* wasps are used to control stable flies in intensive livestock industries

OBJECTIVE: To determine the impact of the parasitic wasp *Spalangia endius*, a micro hymenopteran (2-3mm long) parasitoid on stable flies. Specifically, can releases of this wasp reduce stable fly populations on a local scale at and around a cattle feedlot where fortnightly releases of this wasp were carried out over 3 months. Two cattle feedlots were chosen for this trial, 1) Cullalla Feedlot (Cullalla Road) (wasp releases) and Fernview Farms (Wannamal West Road) (control – no wasps released).



Fig. 2. Fernview Farm Feedlot (L) and Cullalla Feedlot (R)

BACKGROUND: *Spalangia endius* is a parasitic micro-hymenoptera (tiny wasp) of both stable fly and house fly (Morgan & Patterson 1977; Morgan 1980; Petersen et al. 1983; Burgess &

King 2015) as well as the filth fly *Physiphora aeneae* (Morgan & Patterson 1977). Stable fly populations were measured across the 2 cattle feedlots (10km apart) for 2 weeks prior to the first releases of *S.endius* wasps and for 2 months thereafter. The *S.endius* wasps were supplied by Bugs for Bugs Pty Ltd, Mundubbera, QLD. Releases of *S.endius* have been done at Cullalla over the past two summers. Anecdotal evidence suggested that the numbers of stable fly had reduced following the wasps introduction, however, there were no measures taken of the stable fly population (using sticky boards or any other stable fly trap), or the % of fly pupae that were actually parasitised by *S.endius* wasps.

There has been little research done on the effectiveness of this parasitoid in Australia and continuing community and livestock producer interest in this control option has prompted the need to assess this option in stable fly affected areas around Perth. Research done on cattle feedlots in QLD measured the impact of *S.endius* wasps at around 20% reduction in stable fly, where a regular sanitation and cleaning regime proved just as effective in controlling flies (Urech et al. 2011). However the level of stable fly populations was not nearly as high in QLD compared with what is encountered in cattle feedlots around Gingin, WA.

METHODOLOGY: Stable fly monitoring traps (sticky white film over white corflute boards) were set up on 22nd Aug, 2016 around both feedlots (3 x 3 grid of traps) and were counted weekly (films replaced each week). After 2 weeks of monitoring to get a baseline of stable fly numbers at each feedlot, releases of *S.endius* wasps were started at Cullalla Feedlot at the rate of 50 wasps/head of cattle (recommended release rate) across 20 release stations around the feedlot. Wasp releases were done every fortnight for 3 months until late November, 2016.



Fig. 3. Sticky film monitoring board with white sticky film before (L) and 30mins after exposure (R) where captured stable flies can be seen on the sticky film

In addition to monitoring adult stable fly numbers, the % parasitisation of sentinel filth fly pupae was measured. Filth flies include house flies (*Musca domestica*), stable flies (*Stomoxys calcitrans*) and black carrion flies (*Australphyra rostrata*). 100 filth fly larvae/feedlot (a mixture of 3 filth fly species) were allowed to pupate naturally (put on soil surface with some grass litter to prevent sun exposure) in 10cm deep containers buried to ground level and left exposed at each feedlot at 2 stations (50 larvae/station) every week for 4 weeks.

Any filth fly pupae were recovered one week after placement at the sentinel stations (*S.endius* prefer to parasitise newly-formed fly pupae). Any adult flies and/or wasps that subsequently emerged from the pupae were captured in the laboratory, identified and collated. This measured the % filth fly pupae parasitised by *S.endius* wasps released at Cullalla and any background parasitisation of filth fly pupae at Fernveiw Farms, where no *S.endius* wasps have ever been released. *S.endius* wasps typically only move up to approx. 100m, so they cannot affect the neighbouring feedlot at Fernview Farms.



Fig. 4. Stable fly larvae sentinel traps (L) where 50 late 3rd instar larvae of *S. calcitrans*, *M. domestica* and *H. rostrata* were allowed to pupate within the cylindrical arena (150mm diameter) close-by to *S. endius* release stations (C) as shown at Cullalla Feedlot (R).

RESULTS

Stable Fly Populations



Fig. 5. Stable fly trapping board from Fernview Farms (Exposed to flies from August 23-29, 2016) (LHS) with the monitoring zone delineated (RHS) within which stable fly counts are done.

The actual counts on stable fly numbers on each of the 9 trapping boards at each of the two cattle feedlots over 12 weeks of monitoring



Fig. 6. Stable fly trapping board from Cullalla Feedlot (Exposed to flies from August 23-29, 2016) (LHS) with the monitoring zone delineated (RHS) within which stable fly counts are done.

Filth Fly Parasitism by *S.endius*

Tables 1 and 2 below indicate the level of parasitism found in sentinel larvae of *S.calcitrans* and other filth flies that were exposed for one week at each of Fernview Farms (Table 1) and Cullalla Feedlot (Table 2). At Fernview Farms, only 1 spent pupal case was found from the exposed sentinel larvae to have been parasitised by a micro-hymenopteran pest, of which *S.endius* is one species. It was not possible to determine what species of parasitic wasp had parasitised the filth fly pupae. At Cullalla Feedlot, no filth fly pupae set out as sentinel larvae, were parasitised by any parasitic wasp species over the 4 weeks of exposing the sentinel larvae.

Table 1. Fernview Farms

Sampling Date	Filth Flies			No emergence	Parasitised
	SF	HF	BCF		
4/11/16	2	2	32	9	0
	0	0	6	3	0
11/11/16	7	32	2	1	1
	0	5	0	1	0
18/11/16	13	0	7	3	0
	0	1	12	3	0
25/11/16	0	0	8	0	0
	0	0	9	2	0
Total	22	40	76	22	1

SF=Stable Fly (16%); HF=House Fly (29%); BCF=Black Carrion Fly (55%)

Table 2. Cullalla Feedlot

Sampling Date	Filth Flies			No emergence	Parasitised
	SF	HF	BCF		
4/11/16	5	0	24	5	0
	4	0	5	2	0
11/11/16	1	0	0	1	0
	2	26	9	3	0
18/11/16	0	0	26	7	0
	0	0	23	5	0
25/11/16	0	0	2	8	0
	0	0	9	4	0
Total	12	26	98	35	0

SF=Stable Fly (9%); HF=House Fly (19%); BCF=Black Carrion Fly (72%)

Discussion

In total, 34 SF, 66 HF and 174 BCF were recovered from filth fly pupae exposed at the two cattle feedlots (12% SF, 24% HF and 64% BCF). The percentage emergence of flies from the filth fly pupae recovered was 138/160 (86%) at Fernview and 132/171 (77%) at Cullalla Feedlot. Only 1 filth fly pupae (0.3%) from the 327 pupae recovered over the 4 weeks of assessment was found to be parasitised by a parasitic wasp and it was at the feedlot (Fernview), where no releases of *S.endius* were carried out.

The “parasitised” fly pupae supplied by Bugs for Bugs were assessed from what was in the release stations at both Cullalla Feedlot and the neighbouring vegetable grower’s property (Sativa Gardens, Kevin Dobra). There was an issue with supply quality as the % of fly pupae in the release stations that had been parasitised by *S.endius* was 21.1% and 32.5% respectively, which is well below the claim by Bug for Bugs of the product containing approximately 70% of parasitised fly pupae (Urech et al. 2011).

Conclusion

In summary, it would seem that the releases of *S.endius* wasps at Cullalla Feedlot did not result in the successful parasitism of any filth fly pupae (including stable fly) based on our methodology of exposing 100 filth fly pupae across 2 sentinel stations within the cattle feedlot each week for 4 weeks in succession. The use of this parasitic wasp in this setting would then not be expected to have had any measurable impact on the stable fly populations – in particular the product supplied was below the expectation of 70% parasitised house fly pupae from which the adult *S.endius* emerge in order to parasitise any newly formed filth fly pupae within the vicinity of the feedlot.

Thankyou

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- Cullalla Feedlot - Cullalla Road, Moondah, Shire of Gingin; Angus Graham – Manager
- Fernview Farms - Wannamal Road South, Cullulla, Shire of Gingin; Darren Fernie - Owner

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