



*Spalangia endius* - fly pupal parasite  
Photo: Chris Freebairn



## Spalangia - fly parasite

### Biocontrol organism

#### *Spalangia endius*

Spalangia are tiny wasps (2–3mm long) that are naturalised to Australia. They are parasites of certain fly species and harmless to other insects and to all vertebrate animals including humans.

The adult female wasp lays her eggs into immature fly pupae. After hatching, the wasp larva feeds on the developing fly, ultimately killing it. About three weeks later, the adult wasp emerges from a small hole in the fly pupal case to mate and continue the cycle.

#### Target pests

A wide range of fly pests, including:

- House fly *Musca domestica* and
- Stable fly *Stomoxys calcitrans*

These species are commonly found associated with feedlots, piggeries, poultry farms, horse studs, refuse centres and landfill sites. They cause problems in feedlots and anywhere intensive animal husbandry is practised. These flies cause significant annoyance to livestock, staff and neighbours and can carry disease.

The fly life cycle includes four stages: egg, larva, pupa and adult. Adult female flies lay batches of about 100 eggs in manure or other suitable breeding sites. A single female may produce over 500 offspring in her lifetime. After hatching, fly larvae spend several days feeding on the surrounding material. They then pupate and emerge as adult flies.

Chemical control of fly pests is possible but the development of resistance is an increasing problem. Whenever chemicals are used near animals, there exists a risk that residues may occur in meat and milk products.

#### Suitable crops/environments

Because of their short life cycle and the large numbers of eggs laid, flies can quickly become pests in any area where suitable

breeding sites are available. Feedlots and other sites of intensive animal husbandry are particularly susceptible to nuisance fly populations.

House flies and stable flies generally breed within feedlots, in drains, sedimentation basins, silage pits, spilt feed and areas of undisturbed manure.

#### Before release

Spalangia should be released regularly during spring and summer. The wasps may build up naturally without augmentative releases but it will take much longer for natural populations to reach levels at which effective control of fly populations can be achieved.

In winter, the cooler, drier environment leads to a decline in numbers of both fly pests and parasitic wasps. It is best to release spalangia weekly or fortnightly, starting in spring or early summer before fly populations escalate to unmanageable levels. Extra releases should be made if fly populations are high.

#### At release

Spalangia are supplied as parasitised pupae in paper cups mixed with sawdust or vermiculite. Each cup holds 2,500 wasps. Transfer the pupae to cardboard cylinders (available from Bugs for Bugs) and hang along fence lines or other suitable sites near to areas of manure. In horse stables and other indoor environments they can be sprinkled around the pens and areas where flies might breed. Spalangia parasites will emerge and seek out their hosts in the manure piles. They burrow down into the manure to deposit their eggs into the fly pupae.

#### Recommended release rates

Large animals (cows & horses): 100-500 wasps per animal per fortnight.

Small animal husbandry (eg poultry): minimum two wasps per animal per fortnight.

Recommended release rates may vary





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according to the levels of existing fly populations, prevalence of manure or other suitable breeding sites. Levels of moisture, temperature, humidity and presence of other natural enemies of flies may also have an influence.

### After release

It is difficult to detect the adult wasps after release because of their small size. Regular monitoring by an experienced scout is recommended to check that the spalangia have established. Fly pupae can be collected regularly and kept until either a fly or a parasite emerges. This procedure will help to determine the levels of parasitism.

### Cultural practices to aid establishment

Historically chemicals have been used to control nuisance flies. Increasing problems with resistance to pesticides and the threat of residue in meat and milk products have led to a worldwide trend towards more ecologically sustainable control methods. We encourage farmers to adopt an integrated pest management (IPM) approach to nuisance fly control. Good sanitation impedes fly breeding and assists the establishment of natural enemies including spalangia. Fly breeding substrates such as manure, spilt feed and vegetation should be removed or kept dry. Carcasses should be covered completely, (preferably more than 1m deep) in composting facilities, to prevent blowflies from breeding. Vegetation around feedlots and around the perimeters of sedimentation systems and effluent ponds should be mowed regularly. This will reduce areas where flies can shelter.

### Chemical use

Spalangia are very effective parasites of fly pests but they are delicate organisms and easily harmed by insecticides. Most chemicals used against adult flies are also toxic to spalangia. Following insecticide application, wasp populations will take much longer to recover than flies so biological control is reduced during this period.

If chemical treatment is required, some larvicides such as cyromazine are less

harmful to spalangia and often provide better control over an extended time. Larvicides generally tend to be less harmful to wasps and the environment. Granular baits and bait strips should also be used as part of an IPM (integrated pest management) approach to nuisance fly control.

### Additional information

Spalangia are usually despatched by overnight courier or express post and should be received within one or two days. Spalangia wasps are well protected within the fly pupal case and generally travel well. It is a good idea to retain 50 to 100 pupae to determine the survival of parasites as a means of ensuring that there have been no problems during transport.

On arrival, spalangia should be released as soon as possible. In the event of adverse weather such as extreme heat or high rainfall, they may be stored for several days before release in a dark room at about 15 - 20°C. They should not be refrigerated.

### Other natural enemies of flies

- Other wasp species (several)
- Predatory mites
- Entomopathogenic fungi



Spalangia wasp emerging from fly pupa

Photo: Chris Freebairn

