

# (No) effect of oral ivermectin treatment of ponies on dung degradation in semi-natural pastures. A field study.

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## Field experiment

### Objectives:

- To investigate the effects of **ivermectin** and the presence of **earthworms** on the degradation rate of pony dung simultaneously in a nature area.

### Study area:

- Semi natural **pastureland**, experimental biological farm.
- Darmoor **ponies**, outside all year round.

### Treatment week:

- Each day 5 ponies were put into a new enclosed part of the field.
- Each morning 20 fresh **dung pats** were collected and laid in another field under netting (against birds), half of the pats on 'root cloth' ('no worms'), the rest on coarse plastic grids ('worms').
- Routine treatments by vet in early June 2008 (Eraqell oral paste; 40 g ivermectin per pony).
- Dung collected on 2 days prior to treatment (days -2 & -1) and during 3 days afterwards (days 1, 2 & 3).

### Monitoring:

- Dry weight** and **organic matter** weight of dung monitored during 58 weeks.
- Ivermectin **residue analysis**.



Fig. 1. Photographic impression of the experiment.

## Results

- No significant relevant effects** of ivermectin treatment ('day') on dry weight, organic matter weight (Fig.2), the disappearance rate constant  $k$  and/or DT50.
- Strong and **highly significant effect** of the presence of **earthworms** on the dung degradation rate (Fig. 2).
- Measured initial levels of **ivermectin in dung higher than known LC50 values** for dung insect larvae (Fig. 3).
- Ivermectin still present after 58 weeks** in upper 5 cm of the soil under dung pats placed on coarse grids (Fig. 4).

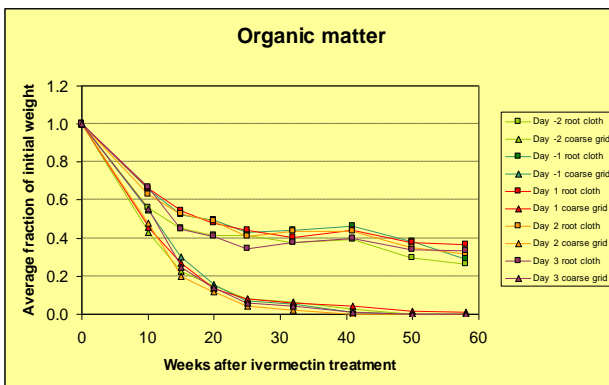


Fig. 2. Disappearance of organic matter in pony dung without or with ivermectin (green lines vs. other colors).

## Conclusions & recommendations

- Toxic levels of ivermectin in dung may not always lead to delayed degradation under field circumstances.
- Earthworms have a big impact on the degradation rate of pony dung (under these temperate conditions).
- The dung insect fauna may have been impacted, but without exercising an effect on dung degradation.
- Ivermectin should not be used in nature conservation areas, or only with certain risk mitigating restrictions..

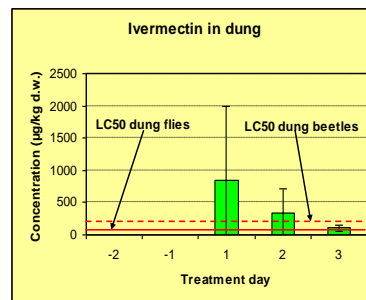


Fig. 3. Initial ivermectin concentration in pony dung after collection in the field, before and after treatment of the animals.

Fig. 4. Ivermectin in soil under (vanished) pony dung pats 58 weeks after treatment of the animals.

