

CONTROL OF BOTULISM IN WATERFOWL IN THE SALT PANS EAST OF NEUSIEDLER SEE

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ABSTRACT

The results of field experiments with chicken carcasses underline an important role of the maggots of *Lucilia caesar* in multiplication, dispersal and transfer of the toxin to birds during an outbreak of botulism. The time of exposure of a fresh carcass necessary for the development of maggots sharply decreased during summer, thus especially in August, dead and sick birds should be removed from the area at least on every 4th day.

INTRODUCTION

Between 1982 and 1992, in the shallow salt pans of the Seewinkel east of Neusiedler See, four serious outbreaks of botulism were recorded, with a total number of 5,365 dead or sick birds collected. From 1984 to 1986, the ecological causes of these outbreaks were the subject of an interdisciplinary study including ornithology, limnology and microbiology. The methods and results of this project have been published in detail in Grill *et al.* (1987). In this paper we concentrate on the role of dung-flies in multiplication, dispersal and transfer of the toxin to waterfowl and summarize the conclusions of our study for the control of botulism.

The role of dung-flies

Since the beginning of this century it is known, that the maggots of some species of dung-flies feeding in the decomposing carcasses of botulism-victims may store the toxin in

their bodies in high concentrations. If they are consumed by waterfowl they cause further dyings. To gain more detailed information on this subject, important for controlling botulism, in a series of field experiments with chicken carcasses, we monitored the development and behaviour of the maggots as well as the significance of the maggots as a food resource for waterfowl. The results of these experiments can be summarized as follows (Grill *et al.* 1987):

- (1) The mass of dung-fly maggots feeding in carcasses in the salt pans of the Seewinkel is *Lucilia caesar*.
- (2) Adult dung-flies can transfer the bacterium to carcasses not yet infected with *Clostridium botulinum*; they so may accelerate the spreading of an outbreak or even transfer botulism to other waterbodies.
- (3) The maggots feeding in infected carcasses may be a toxic food resource at least for gulls, and in the phase of dispersal before pupation probably also for waders. Drowned maggots are floating on the water surface for about five days, and during this time they are a dangerous source of toxin for different species of surface-feeding waterfowl (e.g. dabbling ducks, terns).
- (4) The time the maggots leave the carcass varied not only with air temperature, but also with the season (**Figure 1**): While the time from exposure of a fresh carcass to dispersal lasts more than two weeks at the beginning of June, the maggots start their migration already after a few days at the end of August.

CONCLUSIONS

As a consequence of these results and in accordance with many other studies we recommend the quick removal of sick and dead waterfowl as the most efficient and careful measure in controlling an outbreak of botulism. To discover the first carcasses as early as possible, regular controls of all open shores and margins of reedbelts from June until September are necessary. Considering the time pattern of larval development in *Lucilia caesar* the intervals between the controlling respectively collecting actions especially in late summer should not be longer than 4 days (for details see Grill *et al.* 1987, Westphal 1991).

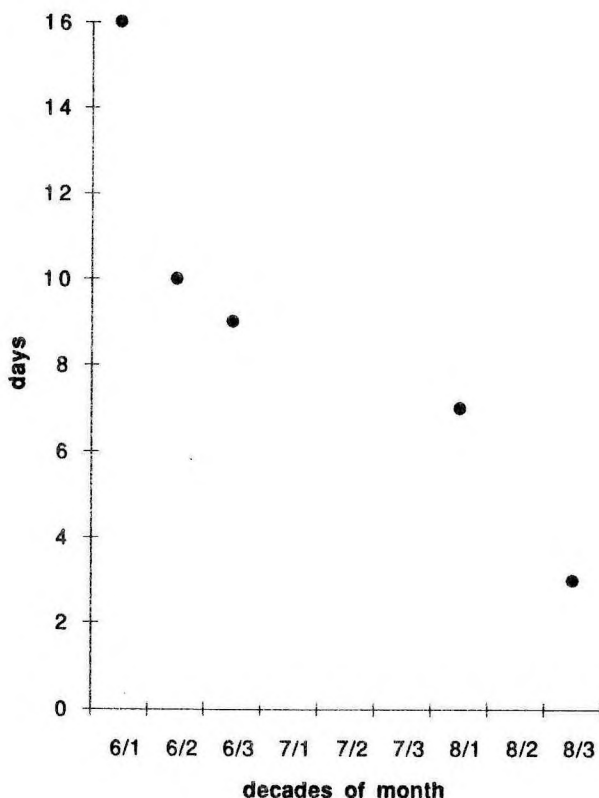


Figure 1: Duration larval development in the dung-fly *Lucilia caesar* (days) between exposure of a fresh carcass and dispersal of the maggots in the decades of June and August (from Grüll *et al.*, 1987)

REFERENCES

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