

BIRD NEST MONITORING STUDIES: standardisation of study designs for the revision of the EFSA Guidance document



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INTRODUCTION

Nest monitoring studies provide an excellent tool to verify the results of avian reproductive tests according to OECD and EPA standards, as they take into account all routes of exposure plus the natural variability.

Despite these advantages, their acceptance by Member States varies, because the actual EFSA Guidance Document 2009 (GD) gives no detailed information about the required test design.

Our work contributes to the standardisation of a nest monitoring protocol in order to enable comparisons:

- among independent field studies
- between endpoints from the avian reproduction studies (tier1 lab studies) and endpoints from field studies with the planned application rate








Fig. 1: Common redstart (*Phoenicurus phoenicurus*) with food in the bill (left); blue tit (*Cyanistes caeruleus*) entering a nest box with food in the bill (right)

SET-UP OF NEST MONITORING STUDY

1. Identify the critical breeding phase(s) according to toxicity endpoints from avian repro studies (OECD 206, EPA).
2. Study in the field the appropriate phase-specific endpoint(s), under realistic exposure conditions and natural variability.
3. Additionally, nest monitoring studies cover the period of parental care of the chicks after hatching (not included in avian repro studies).

Table 1: Overview about critical breeding phases and phase-specific endpoints, modified from Bennett et al. (2005)

| Breeding phases and respective reproduction test endpoints (according to Bennett et al. 2005) | | | | Nest monitoring study (treatment/control design) | |
|--|--|---|---|---|--|
| Phase | Description | Test endpoints used as surrogate (NOEC, OECD 206/EPA) | Phase-specific effect of concern | Proposed endpoints | Method |
| 1 | Establishing a breeding site. Pairing | Change in adult body wt (pre-laying) | Behavioural effects lead to territory abandonment or delayed breeding | Change in body wt of adult individuals before and after the application |  Standardised trapping & weighing of focal species in crop |
| | | | | Abnormal behaviour/observation session | |
| 2 | Copulation and egg laying (5 days pre-laying to end of laying) | Eggs laid/hen | Behavioural effects lead to reduced clutch size or abandonment | Clutch size and % abandoned nests |  Each active nest and the current stage of the breeding are recorded |
| | | Mean eggshell thickness/hen | Reduced eggshell quality | Mean eggshell thickness/nest | |
| | | % fertile/eggs set/hen | Reduced fertility | Viability of embryos/nest | |
| 3 | Incubation and hatching | Change in adult body wt (pre-laying) | Behavioural effects lead to abandonment | Change in body wt of adult individuals before and after the application |  Standardised trapping of focal species in crop |
| | | | | Nest attendance/observation period | |
| | | % hatch/eggs set/hen | Embryotoxicity leading to reduced hatchability | Daily nest survival rate (DSR) | |
| 4 | Juvenile growth and survival until fledging | Change in adult body wt (pre-laying) | Behavioural effects lead to abandonment | Change in body wt of adult individuals before and after the application |  Standardised trapping of focal species in crop |
| | | | | Nest attendance/observation period | |
| | | 5-d juvenile dietary test | Reduced juvenile survival and growth from direct exposure or <i>in ovo</i> exposure | Daily nest survival rate (DSR) | |
| | | % 14-d juveniles/hatch/hen | | % fledglings/hatch/nest | |
| 5 | Post-fledging survival | 5-d juvenile dietary test | Reduced fledgling/juvenile survival and growth from direct exposure | Survival estimation of fledglings |  Radio-tracking of fledglings until day 14 |
| | | 14-d chick body wt/hen | | Body wt of chicks at age of 8 or 14 days (depending on species) | |

CONCLUSIONS

- ✓ Endpoints of nest monitoring studies are comparable to endpoints from avian reproductive studies and even more specific to the effect of concern.
- ✓ With a detailed guidance, field nest monitoring studies can be a valuable tool in the assessment of the PPP risk to birds (and for post-registration monitoring).
- ✓ Agreed standards for nest monitoring studies should be defined in the new EFSA GD on Birds and Mammals.

References:
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