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www.ufaw.org.uk

Animal Welfare 2013, 22: 67-78  
ISSN 0962-7286  
doi: 10.7120/09627286.22.1.067

## **Effects of developmental history on the behavioural responses of European starlings (*Sturnus vulgaris*) to laboratory husbandry**

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### **Abstract**

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*This study examined the impact of rearing environment on the behavioural responses of wild European starlings (*Sturnus vulgaris*) to standard laboratory husbandry procedures. We compared birds that had been caught from the wild as independent juveniles with birds taken from the nest and hand-reared in the laboratory from approximately ten days post-hatch. Although hand-rearing can increase habituation to humans and hence reduce fearfulness in laboratory birds, in other species maternal deprivation is also associated with increased stress-sensitivity in later life. Thus, the welfare benefits of hand-rearing are unclear. We investigated the interaction between rearing environment (12 hand-reared versus 12 wild-caught birds) and current laboratory housing conditions (enriched versus non-enriched cages and top-level cages versus bottom-level cages) on measures of behaviour before, during and after husbandry. Both wild-caught and hand-reared birds reacted to focal husbandry by moving to the periphery of their cages, indicative of high escape motivation during a stressful procedure. Wild-caught birds were overall less active than hand-reared birds. We found no difference in the response of the wild-caught and hand-reared birds to focal husbandry, but hand-reared birds were faster to resume normal behaviour following husbandry than wild-caught birds when housed in the top cages. We interpret our results as showing evidence for chronic depressive apathy (lower overall activity) coupled with greater fear (longer latencies to resume normal behaviour following husbandry) in the wild-caught birds in some environments. Our data support the conclusion that hand-rearing is associated with some welfare benefits for birds involved in laboratory research.*

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**Keywords:** animal welfare, cage position, enrichment, European starling, laboratory husbandry, rearing environment