Farmed deer herd health and production profiling: 1. The concept

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The present study aims to explore the basic health problems and production results from selected red deer *(Cervus elaphus)* farms, to identify and quantify the risk factors associated with outcomes, including health, diseases and mortality, reproduction, growth, carcass and velvet antler production, to investigate a range of deer biological characteristics as markers for sub-optimal production levels and potential health problems, and to identify the most relevant fields for further research. This paper gives an overview of procedures used. More details have been published elsewhere (Audigé *et al.*, 1993; Audigé *et al.*, 1994).

An holistic epidemiological approach called "health and production profiling" (Morris, 1991) was employed to explore health and production on 15 commercial red deer farms in the North Island of New Zealand involving 2700 hinds, 2400 weaner deer and 1500 stags monitored each year for 2 years. Farm characteristics were recorded. From March 1992, farmers recorded daily management practices, individual deer data, health problems and weather data. At three-monthly visits, samples were collected from deer, pastures and soils. Hinds were pregnancy-tested in June by ultrasound.

Farm productivity parameters, such as reproductive performance, weaner growth rates, stag velvet antler yields and mortality rates were tabulated. Key parameters affecting major outcomes (reproduction, growth rates, antler production and disease) and their likely risk factors were to be identified. Preliminary data analyses were carried out to identify associations between single descriptive variables and the key outcome variables in the deer production process. Variables which showed sufficient evidence of an association in this analysis ($P<0.20$) were included in multi-variate analyses, such as multiple linear or logistic regression (Kleinbaum *et al.*, 1982). A series of path models was formulated to identify risk factors which had statistically significant direct and indirect effects on productivity (Pedhazur, 1982).

This study is the first application of herd health and production profiling to commercial deer farming. This technique is able to provide reference values for a range of production, reproduction and health characteristics (McDermott *et al.*, 1991), and is effective in identifying the likely cause and effect relationships between risk factors and outcomes which can then be targeted for further research to establish causality.

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