

Title: Determining the cause and methods of control for 'Spotty Liver Disease'

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Summary

Spotty Liver is a disease of laying birds, which is associated with increased mortality, particularly around the time of peak production and in some instances associated with a decrease in production. The cause of the condition is not known but suspected to be a bacterium, which produces a toxin that affects the liver. The clinical signs include a brief period of depression in laying birds (usually in good body condition and "in-lay"), and increased mortality. Often birds are found dead without any prior evidence of disease noticed. The notable post-mortem finding is the occurrence of small 1-1.5 mm diameter white, grey or red spots on the surface of the liver. In some cases these are raised. Histologically these appear as a multifocal coagulative necrosis.

SLD has increased in importance in laying birds in Australia, as a greater proportion of laying birds are housed in free range conditions. Despite many attempts to identify the aetiological agent, presumed to be bacterial because of the condition's rapid curative response to antibiotics, there has been little progression in understanding aetiology and pathogenesis of the disease. It has been observed that many outbreaks are related to disruptions in bird husbandry particularly as it relates to feed intake, formulation and availability. It has also been associated with free range birds accessing water in the range area. While historically SLD occurred in early lay and predominantly in summer, it now occurs at any time in lay and throughout the year. It is still more common in early lay.

The project included a literature review, field investigations including gross and histopathological examinations, challenge studies, and *in vitro* toxicity and metagenomic techniques to elucidate the cause and examine suitable control options. It involved the investigation of field cases and sampling from both affected birds and those in another shed on the same farm, which were not affected.

An *H. pullorum* like organism was found to be more prevalent in affected birds than in control birds. However, the subsequent isolation of a *Campylobacter* organism from field cases in Australia by Scolexia and Professor Moore (RMIT University), which has sequence homology to the organism isolated by Crawshaw and Irvine from UK cases, suggests that it is the principle pathogen. Its isolation will enable the development of an exposure model that will allow increased progress in assessments of treatment and control methods.