Efficacy of 5-sheep sampling strategy at identification of serogroups of ovine virulent footrot (Dichelobacter nodosus) for targeted vaccination

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Dichelobacter nodosus is a slow-growing anaerobic bacterium. Nine *D. nodosus* serogroups occur in Australia and up to 6 serogroups have been identified from an infected flock at one time. Use of targeted vaccines has successfully eradicated the targeted serogroup from infected flocks. Because of antigenic competition, targeted vaccines can contain at most two serogroups. Identification of serogroups is critical in developing a herd vaccination plan. In New South Wales, the current protocol for laboratory assessment of footrot virulence is to culture 10 colonies identified from swabs of a single foot each from 5 lame sheep. The objectives of this project are to use stochastic simulation modeling to estimate the efficacy of the current sampling protocol at detection of *D. nodosus* serogroups present on a farm, and to compare efficacies based on slide agglutination and multiplex PCR test results. Foot swabs collected from sheep in 12 flocks were used as the basis for a sampling strategy simulation model. The efficacy of both slide agglutination and PCR varied among sheep flocks. The proportion of iterations correctly identifying the two most-prevalent *D. nodosus* serogroups did not differ according to method of detection. The proportion of iterations in which all serogroups in the flock were identified in the initial sample was higher for results based on PCR testing than those based on slide agglutination. The current sampling strategy does not appear to be adequate for detection of *D. nodosus* serogroups for targeted vaccination. Sampling strategies that incorporate a larger number of sheep per flock should be explored.