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Training dogs to detect nematode infections in sheep faeces

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It is well established that dogs have extremely sensitive noses, as much as 100 times greater than humans and have an extraordinary ability to discriminate specific odors such as iodoform at 400 parts per billion (ppb) and even compounds at concentrations as low as one part per trillion (ppt). The exploitation of canine olfactory ability has been expanded in recent years and dogs can now be trained to respond to objects including live or dead humans, as well as to detect explosives, drugs, smuggled agricultural products, accelerants at fire scenes, brown tree snakes, bladder cancer, organochlorine residues in soil, or search for termites, screwworms, cows in oestrus and gypsy moth eggs. However, to date there is no published information on the use of dogs to detect internal parasite infections of sheep. Therefore a study was conducted to assess a dogs' ability to distinguish nematode-infected sheep faeces from non-infected faeces.

'Seb', a nine-month-old German Shepherd bitch was trained for scent detection over a six month period using operant/clicker conditioning and then tested for her ability to detect infected sheep faeces. Training involved placing faeces of varying faecal egg counts in PVC canisters and instructing the dog to locate the canister. Once the dog located the correct canister she was rewarded with a 'click' and received a play with a toy and praise. Trials involved placing uninfected faeces from nine individual sheep in nine opaque paper bags. A tenth bag contained faeces from sheep infected with either *Haemonchus contortus*, *Trichostrongylus vitrinus*, or *Teladorsagia circumcincta*. The ten bags were placed in a circle approximately 0.5m apart. The dog was instructed to locate the bag containing infected faeces as either a single infection or mixed infection from all three species. This was repeated 10 times at each trial. After 8 such trials the dog had a success rate of 90% for *T. circumcincta*, 91% for *T. vitrinus* and 85% for *H. contortus*. Mixed infections were detected 97.5% of the time.

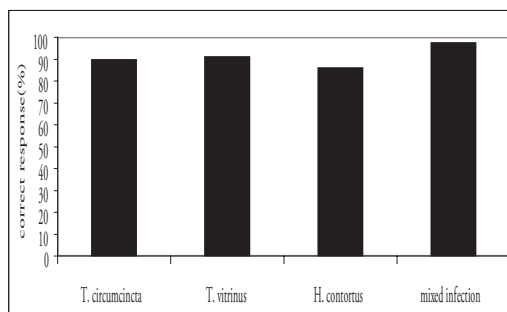


Fig. 1. Seb's success rate at locating nematode infected faeces.

Results were statistically analyzed using a one-proportional binomial analysis. At a 0.5% level of significance ($p \leq 0.05$) the dog would be expected to maintain these success rates at least 82% of the time for *T. circumcincta*, 84% for *T. vitrinus*, 76% for *H. contortus* and 92% of the time for mixed infections. The mixed infection result is encouraging given the likely species composition of field infections. This trial clearly shows that dogs could be used to replace current faecal diagnostic techniques, which would allow rapid on farm testing of faecal samples. Further training will be directed towards detection of the parasites by scenting live sheep.