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ELECTRONIC DEVICES FOR SUSTAINABLE STRATEGIES TO CONTROL CYSTIC ECHINOCOCCOSIS IN GRAZING AREAS IN SOUTHERN ITALY

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INTRODUCTION: Cystic echinococcosis (CE), caused by the larval stage of *Echinococcus granulosus*, has a worldwide distribution and is considered one of the most severe parasitic zoonosis of grazing sheep in the Mediterranean region. The lifecycle of *E. granulosus* involves canids as definitive hosts and usually sheep and other herbivore species as intermediate hosts. CE has a worldwide distribution but exhibits the highest prevalence in communities where pastoral activities predominate, as the Mediterranean areas (Deplazes et al., 2017. *Adv Parasitol*, 95:315-493). Free-roaming dogs (owned and unowned) are the major source of echinococcosis and the most challenging category in dog population management for the control of CE (Kachani et al., 2014. *Acta Trop*, 139:99-108). The present study, conducted in an area of southern Italy (Salerno province) highly endemic for CE, investigated the combined use of Geographical Information Systems (GIS) and electronic devices (e.g., GPS collars, drones, camera traps) to identify the spatio-temporal patterns of free-roaming dogs and to design new anthelmintic treatment strategies for wild canids gravitating near the CE positive sheep farms.

MATERIALS AND METHODS: In five sheep farms positive to CE, one adult sheep and two shepherd dogs were tracked for one month using 15 GPS wearable devices. The spatial and temporal point location data were compared to determine the movement patterns of the animals. For each farm, a specific deworming strategy based on the delivery anthelmintic baits (laced with praziquantel) using a tailored unmanned aerial vehicles (UAVs), was developed. Camera traps were used in the field trial to remotely test three types of PZQ-based baits by evaluating the bait acceptance by target animals (i.e. stray dogs), the integrity over time and the mechanical resistance after the release.

RESULTS AND CONCLUSIONS: The mean daily walking distance travelled not significantly differ between sheep and dogs in the farms monitored. The farthest distances from the farms (1,500mt) were travelled between 10.00 and 17.00. The PZQ-laced baits with a double layer of highly palatable chews showed the greatest resistance in the environment while preserving the attractiveness and palatability up to 10 days, also withstood heights of 25 m. This study confirms the importance of geospatial technology in supporting parasite control strategies. Furthermore, the application of anthelmintic baits using UAVs allows the capillary and automatic distribution of anthelmintics, minimizing waste of time and resources.

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