Rodenticide resistance and environmental monitoring

Identified locations for digital sensors as a warning system for resistant rat infestations on farms (digiWRaP)

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Control measures using anticoagulant rodenticides (clotting inhibitors) against resistant Norway rats (*Rattus norvegicus*) on agricultural farms usually begin only once rat populations are detected randomly because of numerous established individuals, posing a significant risk of pathogen infection to livestock and humans. Hygiene measures can delay a re-establishment for approximately 85 days and can contribute to successful rat control. However, the immigration of new individuals and the establishment of new populations on farms cannot be fully prevented. The aim of this project is to develop a digital warning system that already detects individual rats at a farm at an early stage and reports this to a mobile device. Farmers can then take immediate on-site action to prevent establishment of a rat population. Especially in regions with rodenticide resistance (e.g. Münsterland, North Rhine-Westphalia, Germany), this would reduce the use of the most toxic, persistent, and bioaccumulative rodenticides. This could lower the risk to non-target species and the environment as well as the infection risk. To ensure the successful use of the warning system, bait stations must be placed where rat infestations are most likely to occur. In this project, following successful control measures, the immigration and infestation by Norway rats were monitored at five different farms in the Münsterland, North Rhine-Westphalia. Activity at a total of 144 bait stations was monitored using wildlife cameras and by checking sand plates in the bait stations for tracks. Observation was concluded once a new infestation was detected, defined as activity in 20% of the bait stations during a certain time. Through statistical analyses, we determined which locations and structures are particularly attractive to rats and are thus likely to be infested first, e.g. the immediate proximity to feed stores. Based on the findings, recommendations for the optimal positioning of sensors will be developed as a guide to enable successful use of the warning system on agricultural farms.

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