BCR resistance-tests
bromadiolone on fa
Gerr

SUMMARY

This investigation is part of a research program funded and steered by the Rodenticide Resistance Action Committee (RRAC) of CropLife International to develop and proof methods, which are required to assess the degree of resistance and to draw conclusions for the effective control of populations containing resistant individuals. The aim was to determine whether the level of reduced susceptibility, characterised by the INR-based blood clotting (BCR) resistance-test constitutes "practical resistance".

Earlier BCR resistance tests indicated a high degree of resistance to bromadiolone among Norway rats (*Rattus norvegicus*) on farms in the Muensterland area, Westphalia, which were subjects of three experiments in this study. Rats were trapped and subjected to BCR-tests using different multiples of the ED_{50} for the susceptible baseline strain in order to assess the incidence of resistance and the resistance factor for bromadiolone. Subsequently, standardised treatments with 0.005% bromadiolone grain bait were conducted. Control success was determined by pre- and post-treatment census.

The incidence of resistance to bromadiolone was assessed at 30% with resistance factors at 10 and 15, for females and males respectively in experiment 1. In experiments 2 and 3, incidence of resistance approached 100% with resistance factors at 10. Control success after the subsequent treatments was 72% in experiment 1, and zero and 20% in the other two experiments.

With resistance factors of the Westphalia bromadiolone-resistant Norway rats at or higher than 7 and 10 for females and males respectively, and with a high incidence of resistance, no control was possible with common strength bromadiolone bait.

The INR-based BCR resistance test can provide useful data to predict the practical effect of reduced susceptibility or resistance to an anticoagulant. The test method should be recommended in resistance management for assessing the degree of resistance.

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METHODS: Field Trials

The field trials were carried out according to RRACs' standard protocol in four phases:
a) Implementation of the trial;
b) Pre-baiting census 5 days; following 4 days break;
c) Baiting period: 42 days (trial 1); 35 days (trials 2+3); following 4 days break;
d) Post-baiting census (5 days).

Census method: Consumption of rolled oats during 24 hours; + Foot print index on tracking plates for confirmation.
Baiting method: Distribution of baiting-points according to structural analysis of the estate using the Baytool computer program (Endepols

After the field trial, a control measure with difethialone paste bait was conducted for complete eradication.

RESULTS: Trial No. 1

Degree of Resistance (RF) test dose = 15x / 10x ED_{50}	
INR ≤ 5.0:	2/12 (17%)
INR ≤ 10.0:	6/12 (50%)

Pre-baiting Census (1 day):	2,663g
% Survivors: (Census)	29%
Bait consumed:	9.95kg

[redacted]

treatment with ED_{50}-multiples of 15 and 10, respectively.

- **Assuming these multiples fit well with the RF as determined earlier in this population, the incidence of resistance is supposed at 34%.**