

**Supplementary materials for Journal of Wildlife Diseases DOI: 10.7589/2017-10-250:**

**David A. Eads, Dean E. Biggins, Jonathan Bowser, Janet C. McAllister, Randall L. Griebel,**

**Eddie Childers, Travis M. Livieri, Cristi Painter, Lindsey Sterling Krank, and Kristy Bly.**

**RESISTANCE TO DELTAMETHRIN IN PRAIRIE DOG (DOGS (*CYNOMYS***

***LUDOVICIANUS*) FLEAS IN THE FIELD AND IN THE LABORATORY.**

### **SUPPLEMENTARY MATERIAL**

#### **Summaries of population attributes for black-tailed prairie dogs and black-footed ferrets**

The following information helps to illustrate the implications of flea resistance to deltamethrin for black-tailed prairie dogs (*Cynomys ludovicianus*) and black-footed ferrets (*Mustela nigripes*) at the North and South Enclosures, Conata Basin, South Dakota, US. Burrows in these two colonies were infused with about 4–6 g of 0.05% deltamethrin (DeltaDust<sup>®</sup>, 0.05% deltamethrin, Bayer Environmental Science, Research Triangle Park, North Carolina, US) on an annual basis from 2005 through 2014. To assess colony areas, the colonies were mapped and delineated using the outermost burrow openings at each colony in spring-summer (Biggins et al. 2006b). When infusing burrows on the dusted colonies with DeltaDust<sup>®</sup> (Griebel 2009, 2014; Jachowski et al. 2008; Eads et al. 2011), we counted the number of burrow openings in each colony, an index of prairie dog abundance (Biggins et al. 1993). The minimum number of ferrets in each colony was indexed during fall spotlight surveys (Livieri 2016). Each colony was surveyed for a minimum of 4 nights; prior analyses with data from Conata-Badlands suggest surveyors detect 99% of ferrets on a colony within 4 nights (Biggins et al. 2006a). We first detected evidence of flea resistance to deltamethrin in 2013–2014.

The North Exclosure declined in size from 213 ha in 2007 to 201 ha in 2009 to 122 ha in 2014. The number of North Exclosure burrows increased from 22,671 in 2005 to 28,387 in 2009, but declined by 69% to 8,685 in 2014. During fall surveys in 2007, 2009, and 2014, the minimum number of ferrets on the North Exclosure declined from 20 to 12 to 0, respectively. The South Exclosure was 410 ha during 2007, but had declined to 370 ha in 2009 and 213 ha in 2014. The number of South Exclosure burrows declined from 65,386 in 2007 to 55,273 in 2009, and exhibited a 72% decline to 15,201 in 2014. In the same years, the minimum number of ferrets on the South Exclosure declined from 31 to 14 to 4, respectively.

Thus, at both colonies, numbers of ferrets declined disproportionately faster than numbers of prairie dogs (the latter indexed using densities of burrow openings). This suggests that flea resistance to deltamethrin and plague-caused mortality in prairie dogs and other rodents (and resultant infection of predatory and scavenging ferrets) had a stronger effect on ferrets than prey limitations from plague.

#### **LITERATURE CITED**

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