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SCIENTIFIC NOTE

First Nebraska State Collection Record of the Mountain Pine Beetle, *Dendroctonus ponderosae* Hopkins (Coleoptera: Curculionidae: Scolytinae)

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The mountain pine beetle, *Dendroctonus ponderosae* Hopkins (Coleoptera: Curculionidae: Scolytinae), is the most destructive bark beetle in western North America (Furniss and Carolin 1977). Extensive outbreaks are currently in progress across the region. In 2009 alone, approximately 0.41 and 0.49 million hectares (1.0 and 1.2 million acres) were affected in Colorado and Wyoming, respectively, and since 1996, an estimated 160,000 hectares (396,000 acres) in the Black Hills of Wyoming and South Dakota have been impacted (USDA Forest Service 2010). The mountain pine beetle attacks many pine species including Rocky Mountain ponderosa pine, *Pinus ponderosa* var. *scopulorum* (Engelm.) E. Murray, and limber pine, *Pinus flexilis* James (Pinaceae), both native to Nebraska, as well as exotics such as Scotch pine, *Pinus sylvestris* L., which is widely planted in Nebraska. The mountain pine beetle occurs in British Columbia and Alberta, throughout the western United States, and into northern Mexico (Wood 1982), yet to our knowledge recorded confirmation from Nebraska is lacking both in published literature and in collections. Here we present documentation that the mountain pine beetle is currently widespread at low densities across western Nebraska.

In April 2009, adult specimens were collected from a dead Scotch pine in Banner County, Nebraska, and identified as the mountain pine beetle. This identification was confirmed by scolytine specialist Dr. Donald E. Bright, C.P. Gillette Museum of Arthropod Diversity, Department of Bioagricultural Sciences and Pest Management, Colorado State University, Fort Collins, Colorado. Voucher specimens were deposited in the C.P. Gillette Museum and with the University of Nebraska–Lincoln. Additional specimens were submitted to the USDA-Agricultural Research Service, Systematic Entomology Laboratory, Beltsville, Maryland. Many of these additional specimens were obtained from pheromone monitoring traps.

To survey for the presence of the mountain pine beetle, pheromone monitoring traps were placed at 13 locations across the native ponderosa pine forests of western Nebraska in the summer of 2009 by Nebraska Forest Service staff (Fig. 1). A 12-unit Lindgren funnel trap was used containing a lure of two commercially synthesized mountain pine beetle aggregation pheromones, trans-verbenol and exo-brevicomin, and host volatile myrcene. One trap per location was deployed in mid-July, except at the Wildcat Hills Wildlife Management Area (WMA) and Bordeaux Road locations, where traps were deployed in late July and mid-August, respectively (Table 1). Traps were checked every two weeks and removed in mid-September. Mountain pine beetles were captured and confirmed from each trapping location in four Nebraska counties (Table 1).

Field visits in October 2009 and January 2010 found positive evidence of the mountain pine beetle in the town of Kimball (Kimball Co.), the Wildcat Hills State Recreation Area Nature Center (Scotts Bluff Co.), Buffalo Creek WMA (Banner Co.), Carter Canyon Ranch (Scotts Bluff Co.), Gilbert-Baker WMA (Sioux Co.), and just south of the Hudson-Meng Bison Bone Bed near Crawford (Sioux Co.) (Fig. 1). Of the many beetle-attacked pines examined during these two field visits, few had evidence of successful colonization and reproduction,

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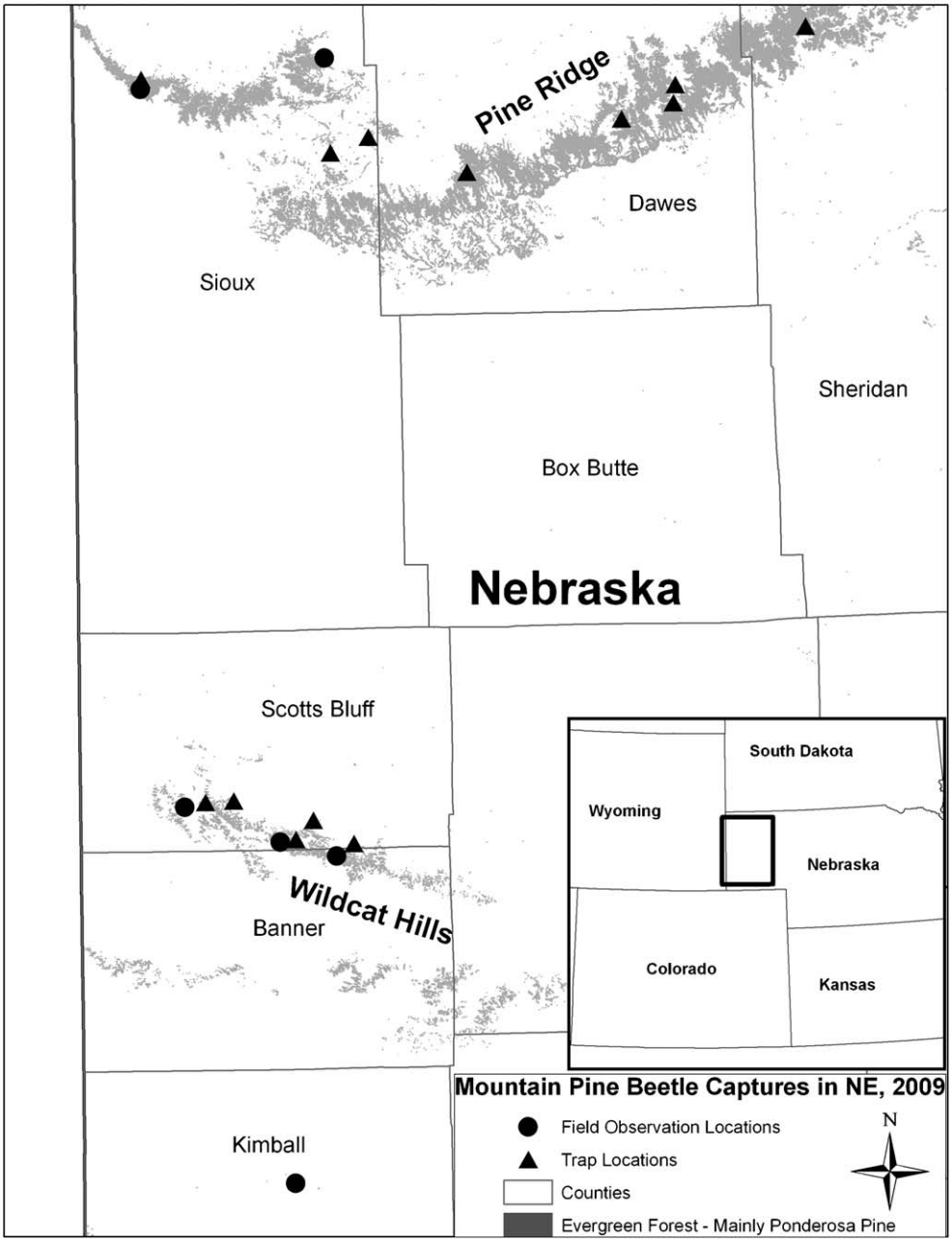

Fig. 1. Map of trap collection and field observation locations of the mountain pine beetle, *Dendroctonus ponderosae*, in western Nebraska, summer 2009.

and even fewer had died. All mountain pine beetle evidence was obtained from ponderosa pine except in Kimball where many Scotch pine trees were examined. Many trees, especially Scotch pine trees, had numerous attacks, but most attacks were "pitch-outs", unsuccessful attempts thwarted by tree defense. A few ponderosa pines killed by the mountain pine beetle appeared to have been attacked

Table 1. Trap catches of mountain pine beetle, *Dendroctonus ponderosae,* in baited Lindgren funnel traps placed throughout western Nebraska, summer 2009. [SP=State Park, WMA=Wildlife Management Area]

County	Location	Total Catch
Scotts Bluff	Carter Canyon Ranch	692
Scotts Bluff	Cedar Canyon WMA	111
Scotts Bluff	Wildcat Hills WMA	198
Scotts Bluff	Bead Mountain Ranch	127
Scotts Bluff	Buffalo Creek WMA	106
Sioux	Gilbert-Baker WMA	68
Sioux	Fort Robinson SP (West)	7
Sioux	Fort Robinson SP (Central)	10
Dawes	Ponderosa WMA	15
Dawes	Chadron SP	13
Dawes	Bordeaux Road, Area 723	9
Dawes	Bordeaux Road, Area 35	12
Sheridan	Metcalf WMA	7

prior to 2009. Most of the currently infested or beetle-killed trees were found near Crawford, and most of these also had been attacked by *Ips* De Geer spp. An instance of discordant development was found at the Wildcat Hills WMA in October, in which pupae and newly formed, callow adult mountain pine beetles were more common under the bark than larvae, which is the usual overwintering stage.

The mountain pine beetle occurs commonly in ponderosa pine in the neighboring states of Colorado, South Dakota, and Wyoming (Wood 1982). Ribbons of ponderosa pine forest extend from eastern Wyoming into western Nebraska throughout the Pine Ridge and Wildcat Hills areas (Fig. 1). It is likely that the mountain pine beetle has been in western Nebraska for quite some time due to the extent of ponderosa pine in western Nebraska, beetle occurrence in surrounding states, and rare encounters reported by forest entomologists.

What remains a mystery is why mountain pine beetle populations seem to have increased recently in western Nebraska's rural and urban forests. Immigration via long distance wind dispersal from mountain pine beetle epidemics in neighboring states and/or importation of infested wood is one possibility. Another possibility could be tied to more favorable weather conditions, which have been associated with increased tree mortality across western forests during the past few decades (van Mantgem *et al.* 2009). Equally unclear is if these larger populations of the mountain pine beetle will persist or if they will subside to the barely detectable densities formerly present.

Acknowledgments

The confirmation of the mountain pine beetle in Nebraska would have not been possible without the assistance and dedication of Mark Harrell and Laurie Stepanek of the Nebraska Forest Service, Lincoln, NE and positive identification by Donald Bright.

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