Nest documentation confirms the presence of a breeding population of Mountain Plover *Charadius montanus* in north-east Mexico

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Documentamos el primer registro conocido de nidificación del Chorlito Llanero *Charadrius montanus* en México, y confirmamos la existencia de una población nidificante aislada en el noreste de México, asociada al amenazado perro de las praderas mexicano *Cynomys mexicanus*. Este descubrimiento tiene implicancias conservacionistas importantes porque *C. montanus* esta siendo considerado para la lista de especies amenazadas del Endangered Species Act de los EUA. Treinta *C. montanus* fueron observados durante siete días en mayo de 1999. Todas las observaciones fueron realizadas en complejos de *C. montanus* de 1.000 ha o más, en áreas con abundante suelo desnudo. Esto pone énfasis en la necesidad de conservar las colonias grandes de *C. montanus* aún remanentes.

Introduction

The recent discovery of Mountain Plovers *Charadrius montanus* in north-east Mexico during the breeding season has led to speculation of the existence of a breeding and possibly resident population in the area[6]. However, nests and or juveniles have not been documented. The possible existence of a disjunct breeding population has important conservation implications for the species. In the USA, *C. montanus* is currently being considered for Threatened listing under the Federal Endangered Species Act. Knopf[1] estimated that *C. montanus* populations declined 3.7% per annum between 1966 and 1993, resulting in the loss of two-thirds of the population.

C. montanus breeds in short- and mixed-grass prairie throughout the western Great Plains, from south Alberta, Canada, to the Oklahoma panhandle, with most in the central and northern plains[2,7]. Isolated nesting records in the Davis Mountains of Texas, east Utah and east-central Arizona are available[6]. An obscure reference from the early 1900s notes probable nesting by a pair in northern Mexico, but no further details were presented[8]. *C. montanus* occurs in areas of short vegetation and bare ground, and is commonly associated with Black-tailed Prairie Dog *Cynomys ludovicianus* colonies[7] (F. Knopf pers. comm.). *C. ludovicianus* creates habitat that *C. montanus* frequents, closely cropped vegetation with large areas of bare ground. Wintering habitats are similar to those used for breeding. While the winter distribution of *C. montanus* in Mexico is poorly known it does occur in north-east Mexico, as well as in the north-centre and north-west of the country at this season, but appears most common in western coastal USA[3–5].

Observations of *C. montanus* in north-east Mexico during the breeding season include individuals in breeding plumage exhibiting breeding behaviour[6]. Knopf & Ruppert[6] report that seven (including three pairs), in breeding plumage, were observed in Mexican Prairie Dog *Cynomys*

Figure 1. The first Mountain Plover *Charadius montanus* nest in Mexico, found in Coahuila, within a Mexican Prairie Dog *Cynomys mexicanus* colony (Martha J. Desmond)

Figure 2. The Mexican Prairie Dog *Cynomys mexicanus* colony (La India) where the Mountain Plover *Charadius montanus* nest was located along with a total of 20 birds (Martha J. Desmond)

mexicanus colonies near San Juan del Prado, in 1994, and seven (including one pair) in three *C. mexicanus* colonies in north-east Mexico, in June 1997. On 24–26 April 1998, Knopf & Ruppert[6] searched *C. mexicanus* colonies in west Nuevo León for *C. montanus* presence and possible nests. Late April was chosen because *C. montanus* begins nesting in the Great Plains in mid-April. During the three-day period, they located 22 individuals in *C. mexicanus* colonies. Sightings included six pairs, with several exhibiting breeding behaviour such as nest-scrape displays, falling-leaf displays, parallel-run displays by males and courtship calls[6]. However, although the birds were exhibiting behaviour unique to breeding, no nests were found. Their presence, plumage and behaviour strongly suggested the existence of an isolated breeding population associated with the colonies of the endangered *C. mexicanus*.

Field observations

On 5–11 May 1999, we searched *C. mexicanus* colonies within Nuevo León, Coahuila, and San Luis Potosí for *C. montanus* presence, breeding behaviour, nests and juveniles. Habitat within the *C. mexicanus* complex is variable but included heavily grazed, short vegetation with widely scattered shrubs and low densities of *C. mexicanus*[6] (MJD pers. obs.). This region of north Mexico is xeric with a predictable rainy season in June–July. We aimed to locate and survey all *C. mexicanus* colonies listed by Ceballos *et al.*[1] in Nuevo León and Coahuila, as well as scattered colonies in San Luis Potosí. During the seven-day period we drove 297 km of transects within such colonies. Thirty *C. montanus* were located in three *C. mexicanus* complexes in Coahuila and Nuevo León, including eight pairs and two groups of three individuals. All *C. mexicanus* complexes with *C. montanus* were 1,000 ha or larger. To describe 'use areas' by *C. montanus* in north-east Mexico, without disturbing birds for more than five minutes, we collected data on vegetation structure at five points in each of 12 use areas. The five points included the centre of the use area and one in each of the four cardinal directions 25 m from the centre point. A Daubenmire frame was used to collect data on percentages of canopy cover and bare ground. For each Daubenmire frame we recorded the percentage of canopy cover that consisted of grasses, forbs and woody vegetation. We also recorded the height of the tallest vegetation within 1 m of the frame (Table 1).

Like Knopf & Ruppert[6] we observed individuals in breeding plumage and behaviour such as the falling-leaf display, nest-scrape displays and courtship calling. Most were located in the early morning or evening within open areas with large amounts of bare ground. Use sites also had short vegetation with a heavy grass and forb component and no woody vegetation (Table 1). Although heavily grazed, many *C. mexicanus* sites contained habitat with high percentages of canopy cover, where *C. montanus* was not observed. Similar to other studies of *C. montanus* breeding ecology, occupied sites consistently had a large percentage of bare ground. During the first four days we observed individuals exhibiting breeding behaviour, but were unable to locate nests. On 9 May we visited a 2,000 ha *C. mexicanus* colony, La India, in north-east Nuevo León. After observing two pairs exhibiting nest-scrape displays we located and photographed the first nest of *C. montanus* in Mexico (Fig. 1). It contained three eggs and was within the shade of a *C. mexicanus* mound. The adult flushed from the nest,

Table 1. Vegetation structure at Mountain Plover *Charadrius montanus* use areas in north-east Mexico (%CC = % cover and % BG = % bare ground).

Site	% CC	% BG	% Grass	% Forb	% Woody	Veg. Hght (cm)
Use Area						
Rancho Los Angelos	35	65	86.6	13.4	0	2.1
La Casista	3.6	96.4	0	100	0	1.5
La Casista	25	75	98	2	0	2.2
La Casista	9	91	46	54	0	1.5
La Casista	14.6	85.4	26	74	0	3.0
La Casista	20	80	75	25	0	1.8
La India	23	77	90	10	0	2.3
La India	5.6	94.4	0	100	0	2.0
La India	23	77	60	40	0	2.7
La India	5.8	94.2	20	80	0	1.8
La India	6.4	93.6	20	80	0	2.5
Nest						
La India	13.6	86.4	100	0	0	2.3

but quickly returned to incubate. This particular colony had low *C. mexicanus* densities, deep alluvial soils and large areas of bare ground (Fig. 2). Twenty of the 30 *C. montanus* we observed were in the colony. This was the only nest we found.

The presence of numerous pairs exhibiting mating behaviour, but only possessing one nest, and the inability of Knopf & Ruppert[6] to locate nests in late April 1998, both suggest that *C. montanus* in north-east Mexico initiate clutches later than those nesting further north and west in the Great Plains. It also appears that the nest located on 9 May was early in the breeding season for *C. montanus* nesting in north-east Mexico. It is probable that the breeding season here is timed such that the hatching of chicks coincides with the start of the rainy season and higher insect availability. Graul[2] also noted the importance of rain and its affect on prey populations for *C. montanus* in the northern plains, reporting that precipitation events were greater in May when young were hatching than in the preceding month during the incubation period.

Management implications

C. mexicanus is considered endangered and is endemic to north-east Mexico. Its range has reduced by 62% within the past 100 years[9]. Historically it occurred in Coahuila, Nuevo León, San Luis Potosí and Zacatecas. The majority of its range is now restricted to Coahuila (24%) and Nuevo León (74%), with only 2% in San Luis Potosí and it has been extirpated from Zacatecas[1,9]. Most extant colonies are small and fragmented but several of 1,000 ha or more persist[9]. Though endangered it is afforded little protection[9]. The most serious threat facing *C. mexicanus* involves loss of habitat to agriculture[9]. Few grasslands remain in north-east Mexico. *C. montanus* populations in the USA are exhibiting strong declines and the discovery of a disjunct breeding population in north-east Mexico is important. To adequately protect the small breeding population of *C. montanus*, it is essential that measures are imposed to ensure the protection of remaining populations of *C. mexicanus*, especially the large colonies found to contain *C. montanus*.

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