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EXTENSION OF THE KNOWN BREEDING RANGE AND BREEDING SEASON OF THE PEREGRINE FALCON IN WESTERN NORTH AMERICA

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The Peregrine Falcon (*Falco peregrinus*) has one of the most widely distributed breeding ranges in the world; however, it has an irregular distribution in tropical habitats (White et al. 2002). Although peregrine populations have been recuperating in northern North America since their historical decline, their status and trend in Mexico are poorly known (Hickey 1969, Cade et al. 1988, Enderson et al. 1995, White et al. 2002). We report the breeding of a pair of Peregrine Falcons in the state of Colima, Mexico, that extends the known breeding range and breeding season of this species along the southwestern coast of North America, and describe its breeding habitat.

METHODS

We detected the presence of peregrines on 11 January 2003 at the Unidad de Conservación y Aprovechamiento de Fauna (UMA) ''La Gloria Escondida'' in the vicinity of Agua Fría, Municipality of Minatitlán, State of Colima, Mexico, while conducting a study on deer harvesting (Santana C. et al. 2002). A breeding pair was observed on a vertical granite cliff (180 m high), at an elevation of 1850 m (approx. 19°18′N, 104°01E), 36 km from the Pacific coast. The cliff is in the Sierra del Perote (altitude span: 80–2040 m) which harbors a continuous 78 000 ha block of forest, and is adjacent to the Sierra de Manantlán Biosphere Reserve with an additional 95 000 ha of continuous forest (Instituto Nacional de Ecología 2000). The nearest weather station in comparable habitat (Las Joyas Research Station, 55 km NW, elevation 1950 m) reports a mean annual temperature of 15.5°C (varying from 12.8°C in January to 17.6°C in May), and a mean annual precipitation of 1826 mm, of which more than 90% occurs between June and October (Jardel P. et al. 2004).

We visited the nest on four occasions (1 February and 11 March 2003, 26–27 February and 24 April 2005) to document breeding activity, and sporadically at other months to document pair residency. We observed the cliffs and the birds with binoculars (8× and 10×) and a viewing scope (32×). Based on mean home range size for the species (White et al. 2002) we characterized land cover types within a 5-km-radius circle centered at the nest. We quantified cover types with a Geographic Information System (ArcView, ArcGis and CartaLInx) constructed with information (1:250 000) provided in the ''Inventario Nacional Forestal 2000'' of the Instituto Nacional de Ecología (INE-SEMARNAT); and topographic maps (1:50 000) of the Instituto Nacional de Estadísticas, Geografía e Informática (INEGI). We also requested reports of observed Peregrine Falcon nests in Mexico through the CIPAMEX discussion list.

RESULTS

We found the eyrie and nestlings on 1 February 2003, in an opening (approximately 1.5 m high × 3 m wide) located 110 m from the cliff base. We observed the eyrie for 3.2 hr starting at 1120 h, during which time the male made two visits. The female and an unknown number of nestlings were heard calling and begging from the eyrie upon each arrival by the male. On 11 March, we observed two nestlings in the eyrie and a third recently fledged nestling perching and making short flights on the cliff approximately 10 m below. Based on an incubation period of 34 d and nestling period of 44 d (White et al. 2002), we estimated a probable hatching date of 25 January and probable egg-laying date of 22 December. Adult peregrines were seen at the cliff from October to May, suggesting permanent residence in this breeding territory.

On 26 February and 27 February 2005, a male and female were detected about 60 m NW of the 2003 eyrie (which was not being used), but no young were seen. On 24 April 2005, during a 5-hr observation period, we observed one fledgling making short flights along the cliff wall, and four visits by the adults. Fledging occurred before 24 April and thus the latest possible egg-laying date must have been 6 February.

The habitat within the 7584 ha circle centered at the nest was composed primarily of deciduous and subdeciduous oak forest, mixed with small patches of broad-leafed

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cloud forest (73.4%). A substantial proportion consisted of tropical broad-leafed sub-deciduous and deciduous forests mixed with patches of *Otatea* sp. bamboo (18.3%). The remaining area harbored deforested lands with pastures, agricultural fields, secondary scrubby vegetation and human dwellings (4.5%) along with pine and pine-oak forest (3.7%).

DISCUSSION

The discovery of breeding Peregrine Falcons in the Sierra del Perote, Colima, extended the known breeding distribution of peregrines southwards along the Pacific coast of North America some 550 km from Baja California and Sonora. This pair did not seem to be the only one in the region. On 21 and 22 April 2005 we explored the rugged and isolated north-facing calcareous cliffs (altitude range of 1180–2300 m) of the Cerro Grande plateau in the Sierra de Manantlán Biosphere Reserve, approximately 15 km from the Sierra del Perote nest site, and observed at least two Peregrine Falcon individuals stooping at a flock of Military Macaws (*Ara militaris*). Peregrines at this site have been observed by locals from December to June.

Although rare, peregrines have been reported breeding in tropical Mesoamerica and the Caribbean in places like Nicaragua and Cuba (White et al. 2002 and references therein) and Dominica (Raffaele et al. 1988). In Mexico, peregrines regularly breed in Baja California and islands in the Gulf of California, in the Sierra Madre Occidental and Oriental in the states of Sonora, Chihuahua, Coahuila, and Durango; and south near Ciudad Victoria, Tamaulipas (Lanning et al. 1977, Hunt et al. 1988, Porter et al. 1988, and reports in White et al. 2002). Peregrines breed in the Sierra Madre Occidental in central Veracruz (O. Cruz pers. comm.), and near Xalapa, Veracruz (J. Montejo pers. comm.). Padilla and Sanchez found a total of 19 Peregrine Falcon nests in 12 yr in the states of Queretaro (five nests), Hidalgo (three nests), Tlaxcala (two nests), Edo. México (seven nests), Puebla (one nest), and Michoacan (one nest; R. Padilla pers. comm.). These reports coincided with other spring and summer sightings of birds in these states and in Sinaloa (Howell and Webb 1995, A. Navarro pers. comm.).

The southernmost reports of potential breeding Peregrine Falcons in Mexico appeared to be those from late spring NE of the city of Oaxaca (approximately 17°05′N; Grosselet 2001, pers. comm.) and from the Caves of Cacahuamilpa in the state of Guerrero (approximately 18°43′N; E. Iñigo and K. Rosenberg pers. comm.). However, in both cases, no nests with eggs or young were observed. Although the reports on central Mexico could be interpreted as an expansion of the breeding range following the general population increase that began in the 1980s (White et al. 2002), this was probably not the case for the Sierra del Perote where they have nested continuously since at least 1970 (JJNFG unpubl. data).

Onset of breeding in the Peregrine Falcon, as in other raptor species, is related to latitude (photoperiod) and local conditions. Raptors tend to breed earlier and have longer breeding seasons at lower latitudes and along coastal areas, where the weather is warmer and food is more readily available in spring (Newton 1977, Santana C. and Temple 1988, White et al. 2002). In the Sierra del Perote, breeding commenced in the dry season and nestlings fledged in spring before the initiation of the summer rains. This coincided with a period of greater abundance of potential prey in the region, especially wild doves and pigeons (e.g., *Patagioenas fasciata*, *P. flavirostris*, *Leptotila verrauxi*, *Zenaida asiatica*; Contreras-Martinez 1992, Santana C. 2000, and White et al. 2002). In southern California, Maryland, Cuba and possibly northwestern Mexico, peregrines laid eggs as early as February (White et al. 2002 and references therein). Our estimated clutch initiation date of 22 December for the pair in the Sierra del Perote expanded the known breeding season for this species in North America by 1.5 mo.

The Sierra del Perote eyrie was isolated, located 3.3 km and 2.5 hr hiking time from the nearest human habitation and road. This forested area has been used for cattle grazing since the 1700s (Cochet 1988) and was visited by landowners about once every 2 wk to tend free-roaming cattle. The nesting pair was, therefore, not regularly subjected to human disturbance. Rock climbing activities conducted in the context of a state government ecotourism program in October 2004 were noticeably disruptive to the Sierra del Perote peregrine pair (E. Padilla and A. Rodriguez pers. comm.) and could have caused the change in nest location in 2005. Because Peregrine Falcons living in remote locations tend to be most sensitive to human disturbance (White et al. 2002), we suggest that this pair should be strictly protected, with no rock climbing activity allowed during the pair's nesting period. The presence of Peregrine Falcons and the high biological diversity in a small (700 ha) management unit within the 5-km-radius area of the nest site (97 species of trees of which 38% are endemic and one species is new to science; 172 species of vertebrates of which 20 are endemic and five are wild Felids; Santana C. et al. 2002, Padilla Velarde et al. 2005) indicate the need to protect the Sierra de Perote.

EXTENSIÓN DEL RANGO GEOGRÁFICO DE CRÍA Y LA TEMPORADA REPRODUCTIVA CONOCIDA DE *FALCO PEREGRINUS* EN EL SUROCCIDENTE DE AMERICA DEL NORTE

RESUMEN.—Reportamos un nido activo y exitoso de *Falco peregrinus*, localizado en la Sierra del Perote, Colima, México (ca. 19°N Lat). Este nido constituye el primer registro de anidación para esta especie en la región fisiográfica de la Sierra Madre del Sur y extiende el ámbito reproductivo de la especie en América del Norte por aproximadamente 550 Km. Observaciones adicionales en la Reserva de la Biosfera Sierra de Manantlán y reportes de anidación no publicados sugieren una mayor amplitud en el rango geográfico reproductivo de *Falco peregrinus* al reportado pre-

viamente. El inicio estimado de la puesta fue el 22 de diciembre para esta pareja, expandiendo el periodo de anidación por 1.5 meses. La composición del hábitat reproductivo caracterizada en un círculo de 7854 ha centrado en el nido, consistió de bosque de encino mezclado con bosque mesófilo de montaña, bosque tropical sub-caducifolio y caducifolio mezclado con manchones de otates, áreas deforestadas con pastizales, campos agrícolas, vegetación secundaria y asentamientos humanos, así como bosque de pino-encino. Como resultado de nuestras observaciones, proponemos que se proteja la Sierra del Perote para asegurar la conservación de *F. peregrinus* y la riqueza de especies de los bosques subtropicales donde habita.

[Traducción de los autores editada]

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