



TURQUOISE JAY *CYANOLYCA TURCOSA* SELF-ANOINTING (ANTING) WITH A MILLIPEDE

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Abstract · Self-anointing has been documented in birds worldwide, including corvids. In self-anointing (active anting), birds rub ants or ant substitutes, such as millipedes, over their feathers. The self-anointing behaviors exhibited by corvids differ according to species, warranting a comprehensive investigation of this family. I report on a Turquoise Jay *Cyanolyca turcosa* self-anointing with a millipede. The jay rubbed the millipede on its rump, undertail coverts, and ventral surfaces of its rectrices. It also swept the millipede over the shoulder, wrist, leading primaries, and wingtips. The jay repeatedly pecked the millipede, probably agitating it to make it release defensive compounds. After the jay rubbed the millipede against its undertail coverts, an arthropod, possibly an ectoparasite, was observed on the millipede. The jay consumed the millipede, providing the first record of a millipede in the diet of this corvid. Self-anointing in Turquoise Jay might serve in repelling and removing ectoparasites and in food preparation.

Resumen · Auto-unción (hormiguelo) de la urraca turquesa *Cyanolyca turcosa* con un milpiés

La auto-unción se ha documentado en aves de todo el mundo, incluidos los córvidos. En la auto-unción (hormiguelo activo), las aves frotran hormigas o sustitutos de hormigas, como milpiés, sobre sus plumas. Los comportamientos de auto-unción que exhiben los córvidos pueden diferir según la especie, lo que justifica una investigación exhaustiva en esta familia. En esta nota, reporto una urraca turquesa *Cyanolyca turcosa* que se auto-unge con un milpiés. La urraca frotó al milpiés en la rabadilla, en las coberteras infracaudales, y en la superficie ventral de las rectrices. También barrió al milpiés sobre el hombro, la muñeca, las primarias externas y las puntas de las alas. La urraca pinchó y mordió repetidamente al milpiés, probablemente agitándolo para que liberara compuestos defensivos. Después de que la urraca frotó el milpiés contra las coberteras de la cola, se observó un artrópodo, posiblemente un ectoparásito, en el milpiés. La urraca consumió el milpiés, proporcionando el primer registro de un milpiés en la dieta de este córvido. La auto-unción en la urraca turquesa podría servir para repeler y eliminar ectoparásitos y en la preparación de alimentos.

Key words: Diet · Ectoparasites · Preening

INTRODUCTION

Self-anointing, also known as active anting, is well documented in birds, including several species in the family Corvidae (Goodwin 1953, Whitaker 1957, Chisholm 1959, Hendricks 1980, Hendricks & Norment 2015, Morozov 2015, Ohkawara et al. 2022). Birds frequently use ants for self-anointing, but may also use “ant substitutes” such as other arthropods (Wenny 1998), snails (Terres 1962, VanderWerf 2005), plant material (Groff & Brackbill 1946, Sedgwick 1947, Nero & Hatch 1984, Clayton & Vernon 1993), and other substances (Miller 1952, Nice 1955, Ivor 1958, Elder 2004). In a related behavior known as passive anting, a bird perches amid ants and allows the ants to crawl through its plumage. Proposed explanations for the self-anointing behavior in birds include: 1) repelling and killing ectoparasites (Dubinin 1951, Kelso & Nice 1963, Clayton & Wolfe 1993), 2) feather maintenance (Simmons 1966), 3) treating bacterial and fungal infections (Ehrlich et al. 1986, Revis & Waller 2004, Ohkawara et al. 2022), 4) enhancing vitamin D production (Kelso 1946), 5) reducing skin irritation during the molt (Southern 1963, Potter 1970), 6) food preparation (i.e., expunging caustic chemicals from the prey animal in preparation for consumption; Judson & Bennett 1992; Eisner & Aneshansley 2008), and 7) sensory stimulation (Whitaker 1957).

Birds reported using millipedes for self-anointing are limited to two species of woodcreeper *Xiphocolaptes* spp. (Parkes et al. 2003, Sazima 2009; Klavins et al. 2014), Little Shrikebill *Colluricincla megarrhyncha* (Sedgwick 1946), Black-throated Shrikebill *Clytorhynchus nigrogularis* (Clunie 1974), two species of mynah *Acridotheres* spp. (Clunie 1976, Chong 2015), European Robin

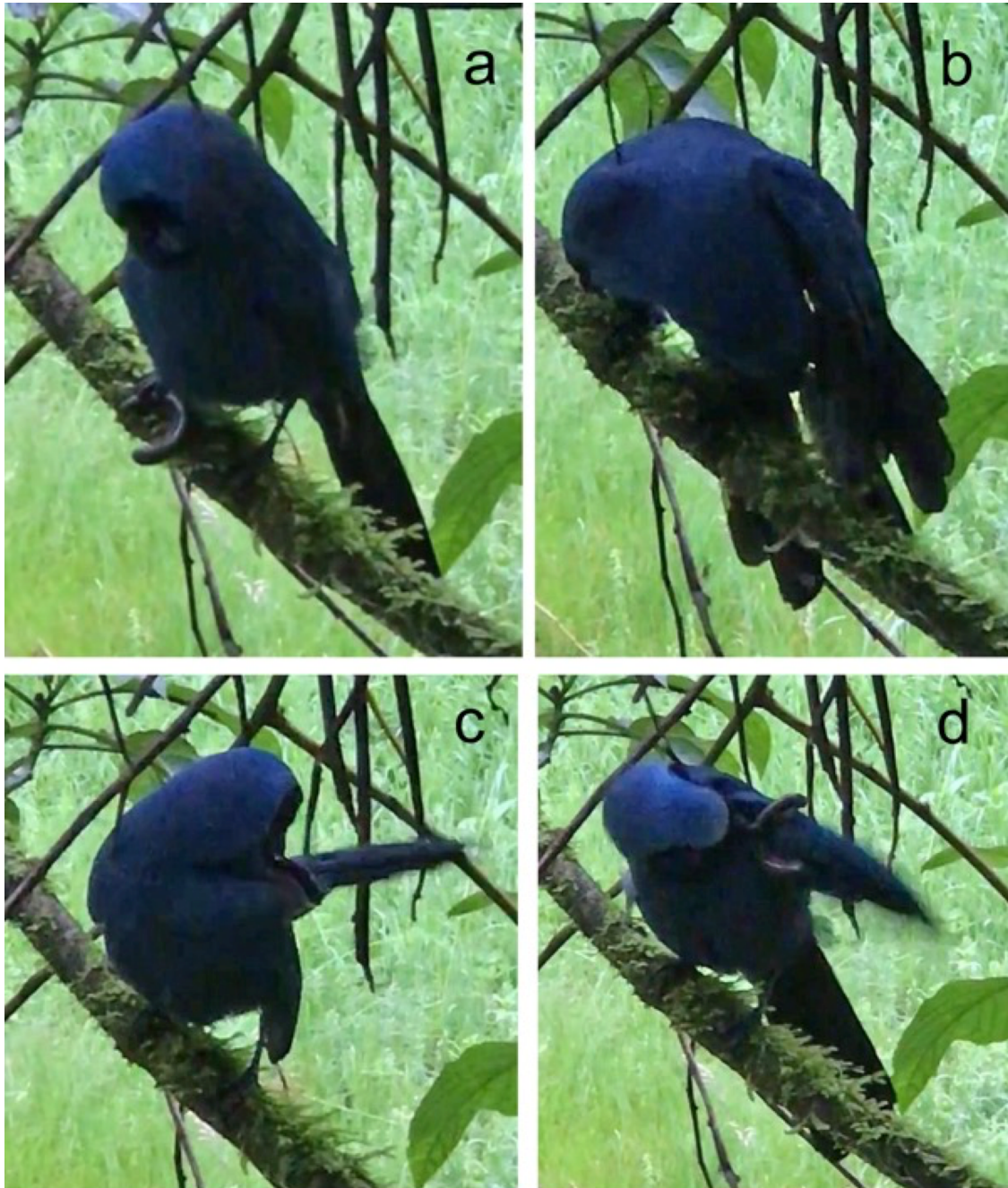


Figure 1. Wild Turquoise Jay (*Cyanolyca turcosa*) self-anointing with a millipede (Class Diplopoda, order Spirobolida or Spirostreptida) 10 km east of Papallacta, Napo Province, Ecuador on 2 August 2018. a. During self-anointing, the jay also preened its breast and abdomen with its bill while holding the millipede under one foot. b. The jay moved its tail to one side and forward and fanned its tail to rub the millipede against its rectrices. c. The jay vigorously rubbed the millipede against its rump. d. The jay swept the millipede over its shoulder, wrist, and proximal surfaces of the leading primaries.

Erithacus rubecula (Thomas 1982, Harrup 1992), two species of trumpeter *Psophia* spp. (Sherman 1996, Parkes et al. 2003), and two species of grackle *Quiscalus* spp. (Cupul-Magaña 2016, Pérez-Rivera 2019).

The self-anointing behaviors exhibited by corvids differ according to species (Goodwin 1953, Ohkawara et al. 2022), although some species apparently do not practice self-anointing. Among those that do, the areas of the body that are anointed differ.

Although the Turquoise Jay *Cyanolyca turcosa* is common in humid, montane forests and forest edges of northwestern South America, little is known about its life history or behaviors (McLean 2020). The species' range is confined almost en-

tirely to Ecuador, but also includes small extensions into southwestern Colombia and northern Peru. The Turquoise Jay is most abundant on both slopes of the Andes Mountains at elevations of 2000 to 3000 m. The species is social, foraging in groups of two to six birds through the midstory and canopy (Hilty & Brown 1986, Welford et al. 2007). Anecdotal dietary reports indicate that the species is omnivorous, eating insects, berries, eggs, and nestlings (Goodfellow 1901).

Millipedes of the orders Spirobohda and Spirostreptida are large, cylindrical-bodied detritivores that occur primarily in the leaf litter of moist deciduous forests. Their segmental defensive glands open laterally and contain benzoquinone compounds, which the millipedes emit when agitated (Eisner et al.

1978).

Herein, I report on a Turquoise Jay self-anointing with a millipede (Diplopoda). The description of self-anointing behaviors provided here is detailed because species-specific differences have been noted among the corvids.

METHODS

The observation occurred near Guango Lodge, approximately 10 km east of Papallacta, Napo Province, Ecuador (0° 22' 45.01" S, 78° 4' 35.94" W, 2,700 m a.s.l.). Located on the eastern slope of the Andes Mountains, the lodge sits on a 300-acre reserve of humid temperate montane forest. I observed the jays using 10 X 50 mm binoculars and filmed behaviors with a cell phone camera.

RESULTS

On 2 August 2018, at 06:37 h CST, at a distance of 5 m, I observed four adult Turquoise Jays perched within 1–2 meters of one another in a garden next to the lodge. I immediately focused on the nearest jay because it was holding a millipede under one foot. I observed it with binoculars for approximately 45 seconds and then filmed the jay for a duration of 1 min, 19 s (video, Macaulay Library, ML357850231).

The millipede was curled into a semi-circular position (Figure 1a). The jay mostly held it mid-body, either under one foot or in its bill. When holding the millipede under one foot, the jay sometimes pecked its side. Once the jay wiped it across the branch it was perched on. The jay occasionally preened its breast and abdomen using only its bill (Figure 1a). Four times the jay twisted its tail to one side, pushed it forward, fanned it, and then vigorously rubbed the millipede against the undertail coverts and ventral surfaces of the rectrices (Figure 1b). Once the jay drooped the shoulder and wing on one side, elevated its tail to a 90–110 degree angle, and vigorously rubbed the millipede over its rump (Figure 1c). The jay also swept and rubbed the millipede across parts of its wing. It usually pushed its primaries forward against the tail and swept the millipede over the outermost primaries toward the wingtip and the adjacent rectrices. Once, the jay elevated a wing and swept the millipede over its shoulder, wrist, and proximal surfaces of the leading primaries (Figure 1d). After the third time that the jay rubbed the millipede against its undertail coverts, a light grayish, 1–2 mm long arthropod could be seen crawling on the millipede. At 6:39 h, the jay held the millipede under one foot, used its bill to twist off one end, and swallowed a small morsel. At 06:43 h the jay flew off carrying the millipede in its bill. I relocated the jay at 06:44 h, 24 m away, and observed it eating the remainder of the millipede.

The millipede that the Turquoise Jay used for self-anointing was a large, cylindrical-bodied millipede (Diplopoda), most likely one of three families: Spirobolellidae, Rhinocricidae, (Spirobolida), or Spirostreptidae (Spirostreptida). The millipede was at least 70–75 mm long, based on a bill length of 34 mm reported for Turquoise Jay (N = 1; Madge & Burn 1994).

DISCUSSION

This is the first report of self-anointing in Turquoise Jay and the first record of a millipede in the diet of this little-studied corvid. When compared to other corvids, the Turquoise Jay's self-anointing behaviors are most similar to those reported for the Eurasian Magpie *Pica pica*, Black-headed Jay *Garrulus lanceolatus*, Purplish-backed Jay *Cyanocorax beecheii*, and Blue Jay *Cyanocitta cristata* with anointing of the wing, tail, and rump feathers (Goodwin 1953).

These observations suggest that self-anointing in Turquoise Jay might serve two purposes: ectoparasite repellent/removal and food preparation. Manipulation of the millipede prior to its consumption is consistent with the food preparation hypothesis. Notably, the Turquoise Jay repeatedly pecked the millipede on its sides, swept it across its feathers, and wiped it on a branch. It seems likely then that the jay agitated the millipede to make it release defensive compounds from the segmental glands. Eisner et al. (2005) found interspecific differences in food preparation behaviors in jays. Blue Jays disarmed bombardier beetles (Coleoptera: Carabidae), which spray defensive substances, by rubbing them on their feathers. Florida Scrub Jays *Aphelocoma coerulescens*, in contrast, disarmed the beetles by wiping them in the sand.

In possible support of the ectoparasite fumigation hypothesis, an arthropod observed crawling on the millipede after the Turquoise Jay had vigorously rubbed the millipede against its undertail coverts may have been an ectoparasite from the jay. The jay may have spread caustic substances from the millipede onto its feathers directly, when it rubbed the millipede against them, and indirectly when it preened using only its bill. The jay's vigorous anointing of the rump suggests that the uropygial gland might be involved.

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