

Pantala flavescens (Insecta: Odonata) Rides West Winds into Ngulu Atoll, Micronesia: Evidence of Seasonality and Wind-Assisted Dispersal¹

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Abstract: Observations of the dragonfly *Pantala flavescens* (Fabricius) on Ngulu Island during early August 2008 constitute the first report of Odonata on Ngulu Atoll, Yap State, Federated States of Micronesia; no other odonate is documented on the atoll, but descriptions by local residents of a larger, rarely encountered, blue dragonfly may pertain to *Anax guttatus* (Burmeister). The sudden appearance of *P. flavescens* on Ngulu after its apparent absence during the previous two and a half weeks of this study, together with the absence of exuviae at potential breeding sites and remarks by local residents alluding to its appearance each year around August and September, suggests that it occurs regularly in migration and that there is no permanent resident population. Its appearance often coincides with winds from a westerly direction.

THE DRAGONFLY *Pantala flavescens* (Fabricius) has a nearly cosmopolitan distribution, being found in tropical and temperate zones worldwide (Steinmann 1997). It is seasonal in many parts of its range and is often encountered in large swarms during migration or directed dispersal flights (e.g., McLachlan 1896, Wakana 1959, Reichholf 1973, Rowe 1987, Russell et al. 1998, Corbet 1999, Srygley 2003, Feng et al. 2006). *Pantala flavescens* is one of the most common odonates among the islands of Micronesia in the west central Pacific Ocean, occurring even on small, low-lying atolls where water resources and potential breeding sites are extremely limited (Liefertinck 1962; D.W.B., pers. obs.). However, little is known about its movements among these islands. To what extent the Micronesian records pertain to transients or to permanent residents is unknown. My observations on *P. flavescens* made during a recent visit to Ngulu Atoll to assess the status of bird, reptile, but-

terfly, and dragonfly populations, along with information obtained from resident islanders, shed further light on seasonal movements of this species in Micronesia.

Study Area

Ngulu Island (8° 18' N, 137° 29' E) is a small (0.1 km²), low-lying, coralline island located in the western Caroline Islands, in Yap State, Federated States of Micronesia (FSM), approximately 105 km southwest of Yap proper and 315 km northeast of the Republic of Belau (Palau). It is the largest and southernmost island on Ngulu Atoll, which has a total land area of only approximately 0.3 km² distributed among two northern and three southern islands; coconut (*Cocos nucifera*) forest is the main vegetation type. Eight people were living on the island at the time of this study, but more than 100 resided at times during the late 1900s. The four other islands are uninhabited. Potential breeding sites for odonates on Ngulu Island are largely confined to a few open cisterns, rain barrels, shallow wells, temporary rain pools in depressions (including bomb craters from World War II), and a cluster of small brackish-water-filled pits used for washing coconut fiber.

¹ Manuscript accepted 1 January 2009.

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during a circumferential walk along the upper beach. Data for wind speed and direction are based on a QuikSCAT Streamline analysis for the Ngulu Atoll area for July and August, courtesy of the National Weather Service, Guam.

RESULTS AND DISCUSSION

There are no published records of Odonata on Ngulu Atoll, but the chief, Mike Ragmau, told me of seeing at least two kinds of dragonflies on the main island, a large blue one, probably *Anax guttatus* (Burmeister), seen only rarely and not every year, and a smaller, reddish brown species seen regularly, usually around late August and September. He stated that their arrival usually coincides with that of migrating barn swallows (*Hirundo rustica*) and with westerly winds.

I was on Ngulu Island from 13 July until 10 August 2008 and first saw barn swallows on 25 July. I searched for odonates daily but saw none until the morning of 1 August, at which time I collected three *Pantala flavescens* (two females, one male) and saw three to four others. The chief recognized the specimens as being the same kind of dragonfly that appeared each year at approximately that same time.

The arrival of *P. flavescens* on 1 August coincided with strong southwesterly and westerly winds that began the previous day and continued throughout the night, accompanied also at times by heavy rains that ended by midmorning. No dragonflies were seen during a return visit to this site later in the day, and none was seen anywhere on the island until 7 August, when one *P. flavescens* was seen flying just offshore, and a female was collected ovipositing in an open cement cistern. Two others were seen along a sandy beach on 9 August. Surface winds at Ngulu Atoll were mainly easterly throughout much of July but veered southwesterly (15–20 km/hr) on 31 July and more westerly during 6–9 August (up to 25–45 km/hr on 7 August), apparently associated with developing circulation systems within the region (Clint Simpson, National Weather Service, Guam, pers. comm.). The winds were variable in strength

and direction during the first week of August and accompanied by scattered showers.

The capture of a *P. flavescens* ovipositing in a cistern indicates that odonates may, at least at times, breed on Ngulu, though oviposition by odonates may not always result in emergent adults. The apparent lack of any exuviae at potential breeding sites, the absence of any sightings of dragonflies during nearly the first 3 weeks of my visit, the sudden appearance of *P. flavescens* following a wind shift and change in weather conditions, and remarks by the chief and the resident caretaker, George Mangthaw, that dragonflies appear regularly during late August and September strongly suggest that there is no permanent resident odonate population on Ngulu. But the source of the transients is uncertain. Palau is the nearest land area, located 315 km to the southwest. However, *Pantala flavescens* is a strong flyer, “a mass migrant traveling up to thousands of kilometers” (Samways and Osborn 1998: 936 and references cited therein), and often encountered by ships at sea (McLachlan 1896, Asahina and Turuoka 1968, Peck 1992, Feng et al. 2006). It could likely reach Micronesia from localities as far as Australia and Indonesia. The recent observations of *P. flavescens* on Ngulu underscore the need for caution in assessing the status of odonates on remote oceanic islands, especially of species known to migrate.

ACKNOWLEDGMENTS

I thank Steve Goodall for furnishing transport to Ngulu Atoll aboard the yacht *Manta*, and Chief Mike Ragmau and George Mangthaw for their assistance during my stay. I also thank Clint Simpson and Chip Guard at the National Weather Service, Guam, for providing a QuikSCAT Streamline analysis of wind speed and direction for the Ngulu Atoll area for July and August 2008.

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