

# Preliminary analysis of seed dispersal by dwarf cassowaries in the Arfak Mountains, Papua, Indonesia

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## INTRODUCTION

The dwarf cassowary, *Casuarius bennetti*, is endemic to the mountain forests of New Guinea, New Britain, and Yapen Island, where it occurs up to about 3300 m in elevation (Beehler et al., 1986). This species has two congeners: the northern cassowary, *C. unappendiculatus*, which is endemic to the lowlands of northern New Guinea, and the southern cassowary, *C. casuarius*, found in southern New Guinea and northeast Australia. The dwarf cassowary is a large frugivorous bird but slightly smaller than the other cassowary species, with a height up to 130 cm and a weight of 25 kg (Coates, 1985; Beehler et al., 1986). Because of its large body size, humans hunt the species in most areas where it occurs.

All cassowary species are highly frugivorous (Crome, 1976; Stocker and Irvine, 1983) with 90-99% of their diet being comprised of fruit (Bentrupperbaumer, 1997; Wright, 2005). Many New Guinean rainforest trees have large fruits and seeds compared to related taxa in other tropical areas that lack cassowaries (Mack, 1993), suggesting that these birds, with their large gapes, could have had an evolutionary influence on the morphology of tree reproductive strategies. Indeed, northern and southern cassowaries are known to play important roles in seed dispersal for many forest plants and are considered keystone species in some parts of New Guinea and Australia due to their strong impacts on tree regeneration (Crome and Moore, 1990; Bentrupperbaumer, 1997; Mack and Wright,

2005; Pangau-Adam, et al., 2014). However, little is known about diet selection and seed dispersal by dwarf cassowaries.

## METHODS AND RESULTS

We conducted a wildlife ecology survey in the Arfak Mountains, Papua, Indonesia from 26 - 30 June 2014, where we recorded cassowary fecal droppings at elevations from 1100 - 2250m, confirming the presence of dwarf cassowary in these areas, where other cassowary species are reported to be absent (Beehler et al, 1986). We collected five fecal piles along ~16 km of survey trails and washed the piles individually to assess their contents. Seeds in the droppings were counted and identified by comparing them to specimens in the Herbarium Manokwariensis, Papua, and using the literature (Cooper, 2013). We identified seeds from 14 plant species in 11 families (Table 1). Nine of the plant species (~60%) were large-seeded, as defined by Westcott et al. (2005), demonstrating the potential importance of dwarf cassowary as seed dispersers of large-seeded plant taxa in sub-montane forests. In a fecal pile at 1210m elevation we detected seeds of *Caryota rumphiana*; this tree species is not known to occur above 500m (Heatubun, pers. comm.). Dwarf cassowaries may have been foraging in lowland forests and subsequently transported the seeds to higher altitudes. Indeed, Wright (2005) reported altitudinal movements of dwarf cassowary in Papua New Guinea, possibly in response to shifting fruit availability. Such altitudinal movements by cassowaries could facilitate lowland plant species to expand their distributions upwards in response to climate change.

Received 1<sup>st</sup> November, 2015; Revision revision accepted.

**Table 1.** Plant species found in dwarf cassowary fecal piles in the Arfak Mountains, Papua, Indonesia. The (\*) denotes plant species with large seeds, following Westcott et al. (2005).

| Family              | Species                      | Sample type |
|---------------------|------------------------------|-------------|
| Arecaceae           | <i>Caryota rumphiana</i> *   | Fruit       |
|                     | <i>Calamus heteracanthus</i> |             |
| Clusiaceae          | <i>Garcinia latisima</i> *   |             |
| Elaeocarpaceae      | <i>Elaeocarpus sp.</i> *     |             |
| Euphorbiaceae       | <i>Glochidion rubrum</i>     |             |
| Flacortiaceae       | <i>Sp. 1</i> *               |             |
| Lauraceae           | <i>Cinnanomum sp.</i>        |             |
|                     | <i>Endiandra montana</i> *   |             |
|                     | <i>Tristania sp.</i> *       |             |
| Melastomataceae     | <i>Memecylon sp.</i>         |             |
| Meliaceae           | <i>Dixocylum sp.</i> *       |             |
| Moraceae            | <i>Ficus carolis</i>         |             |
| Myrtaceae           | <i>Syzygium sp.</i> *        |             |
| Rosaceae            | <i>Prunus turneriana</i> *   |             |
| unidentified spp.   |                              |             |
| Ferns –young shoots |                              | Non-fruit   |

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