

SCIENCE & RESEARCH SERIES NO.66

**SOME ASPECTS OF THE ECOLOGY
AND BREEDING BIOLOGY OF PAREA
ON SOUTHERN CHATHAM ISLAND,
JULY 1992 - APRIL 1993**

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by

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Published by
Head Office,
Department of Conservation,
P O Box 10-420,
Wellington,
New Zealand

ISSN 0113-3713
ISBN 0-478-01576-3

© March 1994, Department of Conservation

Cataloguing-in-Publication data

Some aspects of the ecology and breeding biology of parea on southern Chatham Island, July 1992 - April 1993 / by Ralph Powlesland . . . [et al.] Wellington, N.Z. : Dept. of Conservation, 1994.

1 v. ; 30 cm. (Science & Research series, 0113-3713 ; no. 66.)
Includes bibliographical references.

ISBN 0478015763

1. Chatham Island pigeon--Breeding. 2. Chatham Island pigeon--Counting. 3. Chatham Island pigeon--Feeding and feeds. 4. Chatham Island pigeon--Habitat. 5. Rare birds--New Zealand--Chatham Islands. I. Powlesland, Ralph G. (Ralph Graham), 1952- II. Series: Science & research series ; no. 66.

598.65099349 20NZ

zbn94-019347

Keywords: parea, *Hemiphaga novaeseelandiae chathamensis*, numbers, diet, breeding, conservation, Chatham Island

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ABSTRACT

This report describes the results from the second year of a research programme on parea or Chatham Island pigeon (*Hemiphaga novae-seelandiae chathamensis*) at southern Chatham Island. One of two marked adult females disappeared in 1992-93. However, at least five of six parea marked as nestlings in 1991 were alive in April 1993. Two of the five birds, both females, bred when less than a year old. Limited sightings of the other three birds suggest none of them paired during the 1992-93 breeding season. The total number of pigeons in the Awatotara and Tuku study areas increased by 36% from about 33 adults in 1991 to about 45 in 1992. The ready availability of ripe fruit from matipo (*Myrsine chathamicus*), supplejack (*Ripogonum scandens*) and hokataka (*Corokia macrocarpa*) in autumn and an abundance of hoho (*Pseudopanax chathamicus*) fruit that began ripening in winter were probably important factors in promoting the early start (June) to breeding in 1992. Once hoho fruit sources had been exhausted in the pairs' valley home ranges, the birds flew to tarahinau (*Dracophyllum arboreum*) forest on the tableland to feed on the later ripening hoho fruit there. The nesting efforts and success of 16 pairs were monitored. Nesting began in early June and most eggs were laid between then and November. All pairs nested at least once, and two pairs nested four times each. The most productive pair raised three fledglings. Overall, 24 fledglings were raised from 37 nesting attempts; 65% success and an average of 1.5 fledglings per pair. The contents of only two of the 13 failed nestings were obviously taken by predators. Other reasons for failures were abandonment (1), infertile egg (2), and insecure/inadequate nest (2). On at least 6 of 12 occasions that pairs fledged a chick and re-nested, females laid their next clutch 4-8 days **before** the nestling in their previous nest fledged.

1. INTRODUCTION

The parea, or Chatham Island pigeon, is a large (680-960 g) fruit pigeon, endemic to the Chatham Islands. Parea were common on Chatham, Pitt and Mangere Islands when the Chathams group was visited by early European naturalists in 1867 (Travers and Travers 1872). By 1938 there were few pigeons north of Waitangi, Chatham Island (Fig. 1), however they remained moderately plentiful in forested areas to the south (Fleming 1939). By 1975 there were only sporadic sightings of parea in the northern parts and it was considered rare in the southern forests of Chatham Island (Merton and Bell 1975). A survey during the summers of 1988 and 1989 of much of Chatham Island suggested a population of about 40 birds (Grant 1990). This rapid decline of parea following European colonisation had led to the subspecies becoming critically endangered. The reasons for the decline were considered to be forest clearance for farming, degradation of the remaining forest by browsing stock (cattle, sheep, pigs) and possums (*Trichosurus vulpecula*), predation by cats and rats (*Rattus* spp.), and hunting by people.

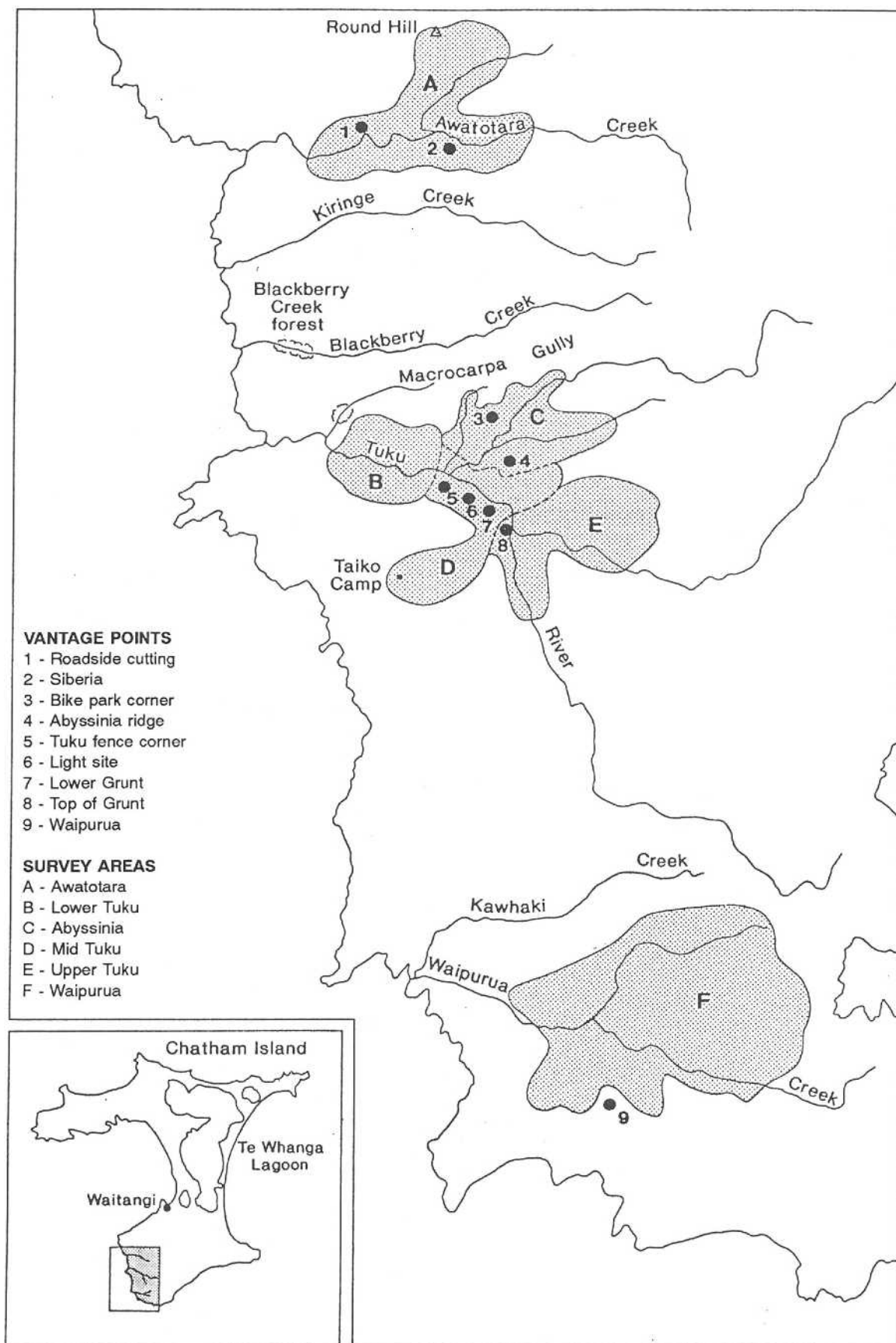
Since so few birds were evident during the 1988-89 survey and extinction of parea seemed imminent, a draft recovery plan was prepared. Actions considered necessary to reverse the decline of parea were listed (Grant 1990). One of the objectives of the plan was to gain as much information as possible about the ecology and biology of parea so that the most appropriate management actions could be undertaken. This report describes the results of the second year of a three-year intensive field programme to meet this objective, and makes recommendations for future research and management of parea.

2. METHODS

2.1 Study areas

The main study areas were the forested Awatotara and Tuku valleys (Fig. 1) and most of the fieldwork from July 1991 until January 1993 was carried out here. These areas contained the largest known numbers of parea; 35-40 birds in May 1991, two of which were radio-tagged (Clout and Robertson 1991). Here operations had been underway since 1989 to improve the forest for parea by trapping cats and possums, and controlling feral stock. In 1991, the lower portions of both valleys were covenanted under the Forest Heritage Fund scheme by landowners Bruce and Liz Tuanui. These blocks of open forest and pasture were fenced in 1992-93 with funding from the Forest Heritage Fund and the Department of Conservation. Index trapping of possums in the two covenanted blocks during August-September 1992 indicated densities of 1-3 possums/ha. Subsequently, sustained possum control was begun in November 1992 using poison pellets in permanent bait stations to keep possum densities as low as possible (Brown 1992).

In February 1993 it was decided to compare parea breeding effort and success in an area without mammal control with that in the areas described above. The Waipurua catchment



Reproduced from Powlesland *et al.* (1992).

Figure 1 Chatham Island, showing locations of Awatotara Valley, Macrocarpa Gully, and Tuku Valley study areas; survey vantage points (1-9); and boundaries of survey areas (A-F).

(Fig. 1), six kilometres to the south, and therefore well beyond the influence of the mammal control operation, was chosen for this purpose. In April 1993, four parea in the Waipurua were captured and marked with jesses (see 2.3); three of these were also radio-tagged (see 2.3).

2.2 Study periods

Field-trips by the authors were made during: 10-31 July 1992; 8 September - 16 October 1992, 9-13 November 1992, 3-22 January 1993, and 19 April - 7 May 1993. In addition, wage workers spent the following periods monitoring pairs of nesting parea: 16-29 August 1992 (L. Adams), 17 October - 7 November 1992 (C. Tisdall), and 14 November - 17 December 1992 (M. Bell).

2.3 Identity of parea

Parea were individually identified by coloured jesses fitted to their legs. Each nestling, when about a month old, was removed from its nest and jesses fitted to it. Jesses were attached to adults following their capture in mist-nets. Most adults were captured when they flew to ground near a net to feed on clover and were then flushed into the net. Each jess was a strip of PVC impregnated coloured cloth, 13 X 120 mm (obtained from a tarpaulin/tent repairer). It was fastened around the leg by a splice called a falconers' knot, with a 50 mm length hanging from the back of the leg. Parea had either a jess on one or both legs. Jesses made of heavy duty cloth (0.7 mm thickness) remain intact for at least two years. Appendix 1 lists the jess combinations for all banded parea. Some jessed birds were also fitted with transmitters. Two-stage transmitters of about 32 g (supplied by Sirtrack Electronics, Landcare Research NZ Ltd) were attached to birds' backs by harnesses of the kereru (*Hemiphaga n. novaeseelandiae*) design (Karl and Clout 1987). These incorporate a weak link which the parea could break by struggling if the harness ever became snagged. The transmitter signal could be detected from several kilometres away (depending on terrain) and enabled us to locate and monitor individuals regularly.

2.4 Phenology records

In July 1991, Christine Tisdall (University of Otago MSc student) individually marked plants of 11 species known or thought to be important parea foods; mainly fruiting trees and shrubs. The number of marked plants per species varied from 10 to 66, and totalled 327 plants. The marked plants are in the Awatotara, Tuku and Macrocarpa study areas. They were visited in January, April, July and October each year to record the availability (estimated density) of leaf buds, leaf shoots, young leaves, flower buds, flowers, immature fruit, green fruit, half ripe fruit and ripe fruit. Since Christine completed her field work in March 1992 (Tisdall 1992), RGP has continued seasonal phenology observations of these plants, and increased the sample sizes for matipo and karamu (*Coprosma chathamica*). Availability of each phenology stage was subjectively recorded on a scale from 0 (none seen) to 5 (heavily laden), with 0.1 indicating just a trace was seen.

2.5 Diet records

During each field-trip prior to January 1993 between one and three parea had functional radio-tags, and therefore most of the habitat use records (see section 2.5, in Powlesland

et al. 1992) were obtained from a few birds. This could result in biased data being obtained on the foods and habitat requirements of parea. In an endeavour to overcome this problem, prior to the January 1993 trip we changed our procedure of recording parea diet. Instead of recording the activities and foods of parea for as long as a bird could be followed, we recorded the first feeding observation of a parea and then ignored its further feeding activities, unless it shifted to a different plant, a different food in the same plant or resumed feeding after a period of non-feeding activity, for example roosting or courtship. This procedure has resulted in a greater independence of feeding observations by increasing our sample of individual parea observed. At each 'observation' the following details were recorded:

1. **Observer:** initials
2. **Time:** of day (24-hour clock)
3. **Location:** name of study area and precise locality
4. **Habitat type:**
description based on dominant canopy species and whether open or closed canopy:
 - tarahinau - open/closed
 - kopi - open/closed
 - mixed broadleaf forest - open/closed
 - tree fern - open/closed
 - scrub (pouteretere, bracken, tree fern associations) - open/closed
5. **Number of birds:** that were in view (but foods of only one bird recorded)
6. **Birds' identity:** indicated when individually identifiable, otherwise 'unknown'
7. **Food species:** that the bird was eating
 - 8. **Food type:** category of food being tasted, and/or picked and eaten (leaf bud, young leaf, mature leaf, gall, moss, lichen, pasture/herbs, flower bud, flower, immature fruit, green fruit, half ripe fruit, ripe fruit, water, unknown.

2.6 Census and hill-top watches

During the January 1993 field-trip a census of parea in all study areas was undertaken. Parea movements were recorded for the last three hours before dusk by observers (with two-way radios, to discuss bird movements) on the designated vantage points (Fig. 1). Each study area was observed during a different evening. Observers noted the time of each sighting, the number of birds in view, their location, and their direction of movement. Estimates of the number of birds seen in each catchment were made by comparing the sightings of all observers. In addition, during the breeding season (July 1992 - January 1993) observers watched from vantage points at regular intervals to determine whether particular pairs were nesting (see 2.7). These regular hill-top watches enabled us to estimate the number of pairs in the Awatotara and Tuku study areas.

2.7 Nest finding, protection and observations

Nests of parea were found using three methods:

1. When one member of a pair was radio-tagged, this pigeon was regularly located to determine if and where the pair was nesting.
2. Some nests were located when a parea being followed flew off with a twig to nest build or relieve its incubating partner.

3. Two or three people, each with a two-way radio, were stationed on different viewing points to watch for a changeover at a nest. A nest was searched for if a bird was seen to fly to a likely nest tree and then a bird leave the same site within two minutes. These observations were carried out from 0830 to 1130 and from 1600 to 1900 because previous observations indicated that incubating birds changed over once during each of these periods (Powlesland et al. 1992). This method was used when a pair was known to be resident in an area, but their nest had not been found.

An effort was made to prevent rat predation at half the nests. Six 'Ezeset' rat traps baited with cheese were placed under low vegetation at a 20-50 m radius about each nest tree. At one nest, which was on the ground, six gin traps baited with cat lures (salmon food pellets) were used to remove cats, possums and wekas.

Records of parea activities at nests during incubation and nestling phases were obtained by an observer sitting 20-30 m from the nest tree. A hide was not used, but often foliage hid the person to some degree. Most adults proved very tolerant of the presence and movements of an observer; no parea left its nest when approached, or gave the appearance of being alarmed. Similarly, when people were placing or checking traps about nest trees, adult birds showed no concern.

Nests were inspected only if the adults were absent. At readily accessible nests chicks were weighed at about 3-day intervals once they were left unattended (at c. 15 days of age). Weighing continued until they were 35-40 days of age when their wing-flapping and movements to avoid capture were likely to result in injury to themselves or in their falling from the nest. Jesses and a numbered metal band were put on each nestling when it was about 25 days old. A transmitter and harness (see section 2.3) were attached to each of three nestlings when about 35 days old. A feather sample was obtained from each nestling during handling and was stored for later genetic analyses (see Leeton and Christidis 1993).

2.8 Rat index trapping

Index trapping of rats (see Cunningham & Moors 1993) was carried out in July and October 1992, and January and April 1993. Trapping was conducted in the Awatotara Valley (22 sites), Macrocarpa Gully (21 sites) and Tuku Valley (50 sites) (Fig. 1), with the sites being about 50 m apart. At each trap site one Ezeset rat trap was placed under natural cover or in a tunnel of plastic-covered wire mesh. The traps, baited with cheese, were set for three consecutive nights. They were checked daily and any rats identified, sexed and weighed.

3. RESULTS

3.1 Numbers of parea

3.1.1 Survival of marked birds No dead parea were found, nor aggregations of feathers and bones indicating predation or scavenging. However, one breeding female (K-8153) which was first marked in July 1990, disappeared during 1992. She had been seen regularly during each field trip, but was last seen on 31 October 1992, three days after her fledgling had left the nest. Her partner subsequently reared the fledgling. K-8151 (jessed July 1990) was not seen during 1992-93, and K-8161 (jessed December 1991) was seen once in November 1992. Neither K-8151 nor K-8161 occupied home ranges in the study areas and so the lack of recent sightings of them does not necessarily indicate their demise.

Five of the six individually jessed fledglings of the 1991-92 nesting season were seen in April 1993. The sixth bird was last seen in January 1993. It was seen only occasionally after its transmitter fell off in early October 1992, and so its home range is likely to have been beyond the study areas.

3.1.2 Territorial pairs During the 1992-93 breeding season, regular watches were made from vantage points to determine the nesting status of each pair in the Awatotara and Tuku study areas. Although only three of the breeding birds were individually identifiable (jessed), we estimated the home range location of each pair by watching their movements and those of neighbouring birds. When an unmarked adult was seen within a home range we assumed it was a member of the resident pair. All nests found in a particular home range were assumed to be those of the resident pair. This was indicated in several cases by an unmarked adult observed feeding a well-developed nestling or jessed fledgling and later going to another nest in the home range and incubating, or vice versa.

As a result of our hill-top observations we determined how many pairs were present and the general location of the boundaries between the home ranges of neighbouring pairs, especially early in the breeding season when most pairs confined their activities to their home ranges. Unpaired adults were evident, but obtaining an accurate count of their numbers was not possible because of their irregular appearances. Three pairs and at least two unpaired birds were evident in the Awatotara, and 17 pairs and at least eight unpaired birds in the Tuku study area; at least 48 adults in total (Table 1).

3.1.3 Census As recommended in Powlesland et al. (1992), an effort was made to count the parea population in the study areas during the January 1993 field trip. However, it proved impossible to determine the number of individuals present for several reasons. As most pairs had finished nesting before January and were in moult, they were not roosting conspicuously, making display flights or evicting interlopers from their home ranges. Also there were many juveniles present that could not be distinguished from adults at a distance.