

## The further spread of introduced birds in Samoa

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**Abstract** Five introduced bird species were observed in the wild in Samoa in November 2004. The red junglefowl (*Gallus gallus*) maintains wild populations in the mountainous areas; the rock dove (*Columba livia*) is presently confined to urban areas; and the red-vented bulbul (*Pycnonotus cafer*) and jungle myna (*Acridotheres fuscus*) have increased their ranges markedly over the past six years. The last two species, found in most inhabited areas, may be close to their maximum possible distribution in Samoa. The common myna (*Acridotheres tristis*) has also increased in range significantly and efforts should be made to control this species.

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**Keywords** Samoa; introduced birds; red-junglefowl; *Gallus gallus*; rock dove; *Columba livia*; jungle myna; *Acridotheres fuscus*; common myna; *Acridotheres tristis*; red-vented bulbul; *Pycnonotus cafer*

### INTRODUCTION

There are five species of introduced birds in Samoa (formerly known as Western Samoa): the red junglefowl (*Gallus gallus*), rock dove (*Columba livia*), red-vented bulbul (*Pycnonotus cafer*), jungle myna (*Acridotheres fuscus*) and common myna (*Acridotheres tristis*). Although the red junglefowl has been present on these islands for thousands of years, the other species are recent introductions and are still expanding their ranges. Gill *et al.* (1993) and Gill (1999) discussed changes to the distributions of the last three species through to 1998. This paper is a summary of recent observations of all these introduced species, with comments on changes to previously published distributions.

### METHODS

We visited Samoa from 1 to 8 November 2004 and recorded observations of the introduced bird species by locality. Observations were usually made along the roadside, though visits were made away from major roads on vehicular and foot tracks south of Aopo to an altitude of 1500m in central Savai'i, in the Asau development farm and Asau forestry area of western Savai'i and near Afulilo dam in eastern Upolu. The south-western coasts of both islands were not visited. The localities of our records of these species were afterwards mapped and compared with published accounts.

### SPECIES ACCOUNTS

#### Red junglefowl

Humans arrived in Samoa with the westward spread of the Lapita cultural complex around 3000 years ago (Spriggs 1997). This culture brought with it the red junglefowl as well as pigs (*Sus scrofa*) and dogs (*Canis lupus familiaris*). As noted by Engbring & Ramsey (1989) for American Samoa, the red junglefowl includes domesticated, 'feral' and naturally wild populations.

We observed this species from sea level to at least 1200 m altitude on Savai'i. Birds were often heard in the rainforest above 600 m altitude and probably constitute a naturally wild population. 'Wild' birds were also observed on Savai'i in areas of planted bananas *Musa* spp., papayas (*Carica papaya*) and other fruits at 600–900 m altitude. These 'garden' areas were logged and planted the year before our visit but were not actively tended. It is likely the red junglefowl is found throughout both Savai'i and Upolu, though it may avoid the cloud forest above about 1300 m. It has also been recorded on the offshore islands of Namua, Manono and Apolima, though only at inhabited or cultivated sites (Freifeld *et al.* 2001).

Steadman (1989) suggested that red junglefowl could have introduced exotic diseases that caused the decline of some endemic bird species in Polynesia. Direct evidence for such an associated decline is currently lacking, though at least one galliform species has become extinct in the Samoan group. Subfossil bones of a megapode (*Megapodius*

sp.) have been found in an archaeological site dating from 2800 to 1900 years BP on Ofu, American Samoa (Steadman 1993).

### Rock dove

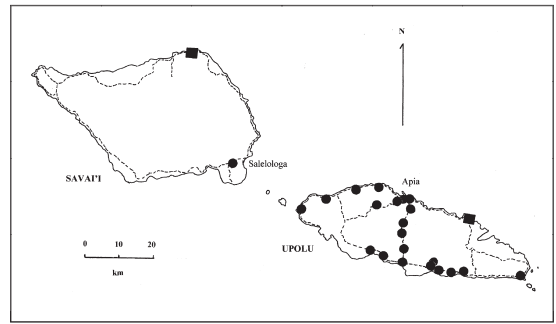
The rock dove may have been present in Samoa and American Samoa for more than 50 years; a flock of 20–30 birds was found in Pago Pago, American Samoa in the 1950s, though later died out (Amerson *et al.* 1982; Muse & Muse 1982). Muse & Muse (1982) suggested there had been earlier records from Samoa, though they gave no details.

The first published records for Samoa were observations made in September 1970 (DuPont 1972). However, the localities concerned were native huts at Lalomalava and Satuiatua on Savai'i and it is unlikely these were the points of introduction. Dhondt (1976) recorded a feral population in Apia in 1973 and 1974, the probable source for the birds on Savai'i. Later observations include sightings at Sasina and Faletagaloa on the north coast of Savai'i in August–September 1979 (Reed 1980); Apia and the Aleipata district of eastern Upolu in 1979 (Muse & Muse 1982); and various localities on Upolu including Apia, Aleipata, Siumi and Fasitootua and Namua Island in 1994–1997 (Tarburton 2001). The last published records of the rock dove in American Samoa appear to have been of two single birds observed at separate localities on Tutuila in 1976 (Amerson *et al.* 1982, Engbring & Ramsay 1989). Both birds were the last survivors of small groups brought from Samoa.

On Upolu we observed the rock dove at Apia, Faleula, Faleolo International Airport and Vailoa in the Aleipata district (see Figure 1). On Savai'i we observed the species only in an area centred on Tuasivi between Siufaga and Fatausi. We did not see it at Sasina and Faletagaloa, despite numerous visits to the area. All observations were of small flocks on large man-made structures, usually churches.

Our lack of rock dove records on the north coast of Savai'i may reflect the severity of two cyclones, Ofa and Val, that struck in February 1990 and December 1991 respectively. These cyclones devastated much of the north-west of the island where extensive areas of forest and many buildings were destroyed. Indeed, the eye of Cyclone Val passed directly over Sasina (Elmqvist *et al.* 1994). Large churches are still present in the Sasina area, though the open vegetation cover found there suggests that the effects of these cyclones were severe.

The rock dove is often considered a benign feature of the environment, however it is known to displace the grey ternlet (*Procelsterna cerulea*) from nest sites on cliffs in the Lord Howe Island group (McAllan *et al.* 2004). On this basis the presence of the rock dove in Samoa is of concern, particularly the population in the Aleipata district coupled



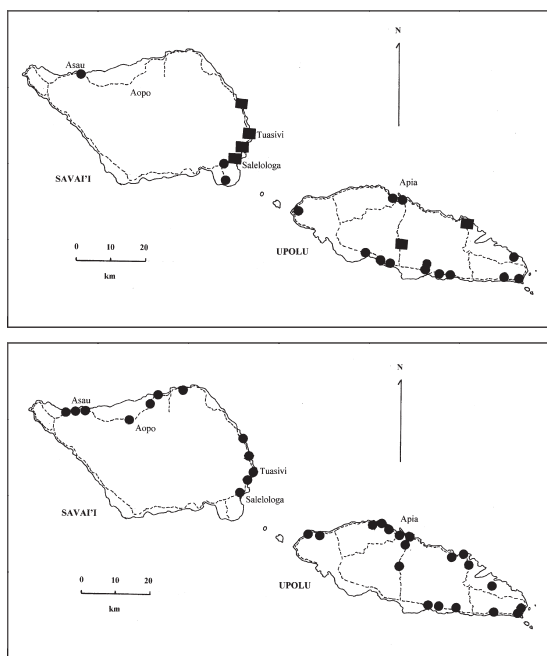
**Figure 1** Observations of rock dove in Samoa, November 2004. Dashed lines are major roads.

with Tarburton's sighting on the nearby island of Namua. These localities are within sight of a marine sanctuary that includes the islands of Nu'utele and Nu'ulua where there is a small breeding population of the grey ternlet (pers. obs.). The grey ternlet is species is rare in Samoa and was considered uncommon in neighbouring American Samoa by Engbring & Ramsey (1989).

### Red-vented bulbul

This species was introduced to Samoa from Fiji in 1943 (Watling 1978a). It was considered common on Upolu in July 1957 (Keith 1957). The first record for Savai'i was in the south-east of the island in September 1970 (DuPont 1972). Gill *et al.* (1993) mapped its Samoan records from the early 1990s (Figure 2) when it was seen over much of Upolu and had been recorded in the north-west of Savai'i at Asau as well as in the south-east. Tarburton (2001) saw the red-vented bulbul between Siufaga and Salelologa in August 1996. Gill (1999) later also recorded it at Falefa Falls east of Apia; on the Cross Island Road on Upolu; and between Puapua and Salelologa on Savai'i (Figure 2). The red-vented bulbul has also spread to nearby American Samoa, where the first records were from central Pago Pago on Tutuila in 1963 (Clapp & Sibley 1966). Again there has been a slow expansion of the species' range and by mid-1996 it was found from Pago Pago Harbour, through to the west end of the island (Freifeld 1999).

In November 2004 we observed the red-vented bulbul at numerous localities on the northern coast of Savai'i where it had not previously been recorded. Our western-most sighting was at Sataua, however it was observed in all towns east of here to Manase, where Gill (1999) did not find it six years previously. We also saw it from Puapua south to Salelologa. On Upolu we observed this species in most areas visited, including a sighting north of Afulilo dam, several kilometres from the nearest habitation. We also saw it near the Lake Lanoto'o turnoff, the highest point on the Cross Island Road.

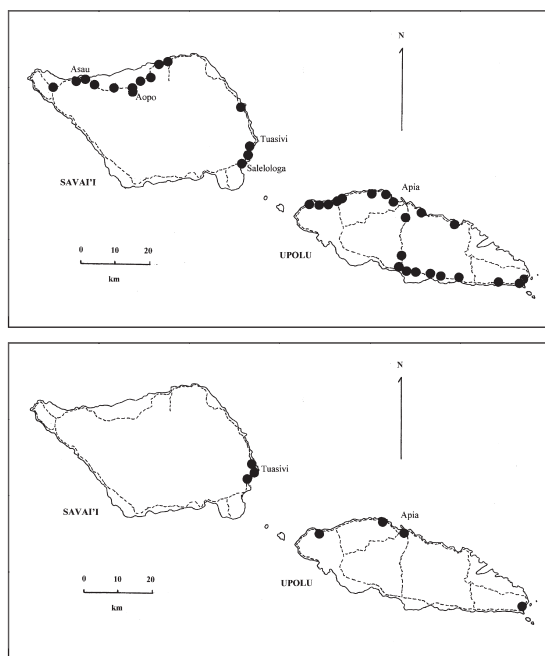


**Figure 2** Observations of the red-vented bulbul in Samoa. Upper: observations by Gill *et al.* (1993) (circles) and by Gill (1998) (rectangles); Lower: observations by authors, November 2004.

Williams & Giddings (1984) thought that on Oahu, Hawai'i, the red-vented bulbul preferred the drier low elevation sites to wet high elevation sites. This appears to be the case generally in Samoa, though the sightings of birds at high elevations on the Cross Island Road indicates the red-vented bulbul should eventually colonise most of the inhabited areas regardless of elevation and rainfall. On Samoa it is found near towns and all roads with a wide grassy verge. The sighting of birds near Afulilo dam was along a dirt road with a wide cut-grass verge. There were no buildings near by nor regular traffic. Such roads are likely to have been important for this species' dispersal in Samoa. In contrast we did not find it at the Asau development farm, less than 5 km south of Asau, nor anywhere along the road between the two localities. This road was fringed for the most part by a thick scrub, evidently regrowth from Cyclone Val in 1991. There are further areas for the red-vented bulbul to colonise in the west of Savai'i and in some of the inhabited valleys on this island, however, the colonisation of the inhabited parts of Upolu is now almost complete.

### Jungle myna

The jungle myna was evidently introduced to Apia some time in the early 1960s (Gill *et al.* 1993).



**Figure 3** Observations of the jungle myna in Samoa. Upper: observations by Gill *et al.* (1993) (circles) and by Gill (1998) (rectangles); Lower: observations by authors, November 2004.

This population remained localised until about 1979 when it spread rapidly on Upolu. It reached southeast Savai'i in the 1980s, but had not spread significantly from this area in the early 1990s (Beichle 1989; Gill *et al.* 1993; Trail 1994). Tarburton (2001) wrote that it was 'seen scattered right around Savai'i' in October 1997. Nonetheless it was obviously still rare on Savai'i. In June 1998, Gill found it only at Avao on the north coast and at the airstrip at Maota near Salelologa (Gill 1999). By this stage it had spread through most inhabited areas of Upolu (Figure 3). The first record of jungle myna for American Samoa was in July 1986 near the airport on Tutuila (Engbring & Ramsey 1989). In the early 1990s through to mid-1996 it was found over much of the Tafuna Plain, but not east of Pago Pago (Trail 1994; Freifeld 1999).

We recorded the jungle myna along much of the north coast of Savai'i, from Faleolupo-Uta in the west, east to the Manase district, at Puapua and from Sapapalii south to Salelologa. Jungle mynas were observed along the main road, often several kilometres from the nearest habitation. A single bird was also seen on a vehicular track about 0.5 km south of Aopo, though this was not far from a cow paddock and vegetable gardens.

On Upolu the jungle myna had much the same distribution as recorded by Gill *et al.* (1993) and Gill

(1999). However, we made no definite sighting of this species in downtown Apia, where the common myna now predominates. Much as with the red-vented bulbul, the jungle myna has spread to almost all inhabited parts of Samoa. This species is also usually found near towns and roadside verges and was also absent from the Asau development farm and other forested areas. It seemed to be more regularly found farther from houses than the red-vented bulbul, and so may eventually have a wider distribution.

### Common myna

Despite earlier reports by Dhondt (1976) it is now believed the first definite records of the common myna for Samoa were from mid-1988 (Watling 1978b, Beichle 1989). Although this species may have been introduced to Samoa from Fiji, it could well have come from American Samoa where the first record was near Pago Pago in October 1980 (Potter 1981). By 1986 it was established on Tutuila at Pago Pago, the airport and elsewhere on the Tafuna Plain (Engbring & Ramsey 1989). Engbring & Ramsey suggested the population on American Samoa may have come from Samoa, however this is clearly not the case. It could have come from Hawai'i as originally suggested by Potter (1981), or perhaps Fiji or the Cook Islands. In the period 1992-1996, Trail (1994) and Freifeld (1999) observed it over much the same distribution as noted by Engbring & Ramsey.

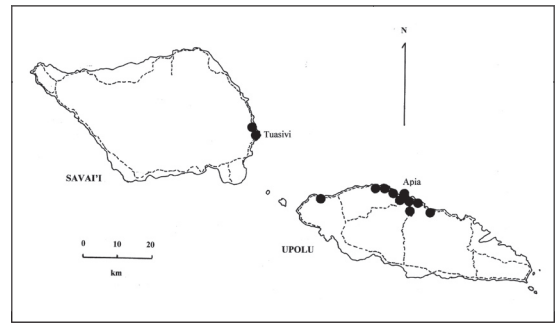
The first records of the common myna in Samoa were from Apia and it remained in this area until at least the early 1990s (Gill *et al.* 1993). In the mid-1990s Tarburton noted it was found from Tanamapua, south-west of Apia, east to Vailele at the eastern edge of the suburban area and south to Vailima (Tarburton 2001). Gill (1999) also found the common myna restricted to suburban Apia, though it then outnumbered the jungle myna locally by perhaps as much as three to one.

We found the common myna dominant in Apia, and on our brief visit did not see any jungle mynas in the centre of the urban area (Figure 4). The common myna has now spread to form a continuous population from at least Afega in the west to Vailele in the east and south to Vailima. Outlying populations were also observed at Lauili in the east and at Faleolo International Airport.

We were surprised to discover a population of the common myna established on Savai'i. It was seen from Siufaga south to Fatausi, in an area centred on Tuasivi, much like the local population of the rock dove. As with the myna populations in Apia, the common myna seemed locally more prevalent than the jungle myna.

### DISCUSSION

Freifeld *et al.* (2001) surveyed landbirds on most



**Figure 4** Observations of common myna in Samoa, November 2004.

of the offshore islands of Samoa in April 1999. However, the only introduced bird species found was the red junglefowl, which was recorded at inhabited and cultivated sites. One of the islands concerned, Manono, is large (2.90 km<sup>2</sup>), inhabited, inside the western reef of Upolu, and less than 5 km from a coast with populations of both the red-vented bulbul and jungle myna. The lack of records of these species on Manono suggests that the introductions on Savai'i were through human intervention, either deliberate or accidental, and did not occur by overwater dispersal.

The spread of the common myna in Samoa is of greatest concern. This species is known to displace hole-nesting birds where it has colonised in Australia and New Zealand. We were also told it behaves aggressively towards Samoan birds, chasing species such as the cardinal myzomela (*Myzomela cardinalis*) from bird feeders (T. Stevenson pers. comm.).

Based on observations made in 1989, Evans *et al.* (1992) considered that there was little interaction or direct competition between the native Samoan birds and the introduced species, largely as their preferred habitats were thought to be mutually exclusive. Nonetheless, these authors noted that the Samoan starling (*Aplornis atrifusca*), cardinal myzomela and Polynesian triller (*Lalage maculosa*) were then common in urban areas. They also recognised the potential for competition with native species if mynas moved into forest habitats. At the time of their observations the common myna population was still small and confined to central Apia and so any competition observed was likely to have been limited.

Freifeld (1999) noted that the Samoan starling was largely absent from village areas of Tutuila where both species of myna were found. She suggested this absence was due to competitive exclusion by the mynas; the gregarious and colonial mynas outcompeting the largely solitary starlings for cavity nest sites. As the Samoan starling was found by Freifeld to prefer plantation and other disturbed localities, this species may ultimately be under threat from the spread of both species of myna.

The next few years are critical for the control of the common myna in Samoa as its numbers are likely to explode to a non-recoverable situation. Methods for the control of this species are being tested by staff at the Australian National University in Canberra, and should be attempted by authorities in Samoa. Perhaps if funding is an issue for myna control it should be linked to sponsored aid from either New Zealand or Australia.

In any case, all these introduced species still have the potential to spread further with the increasing human population of Samoa. Such an increase will undoubtedly be detrimental to most of the endemic bird species.

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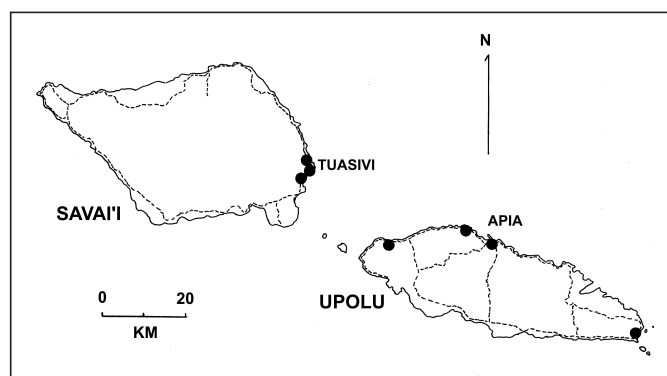
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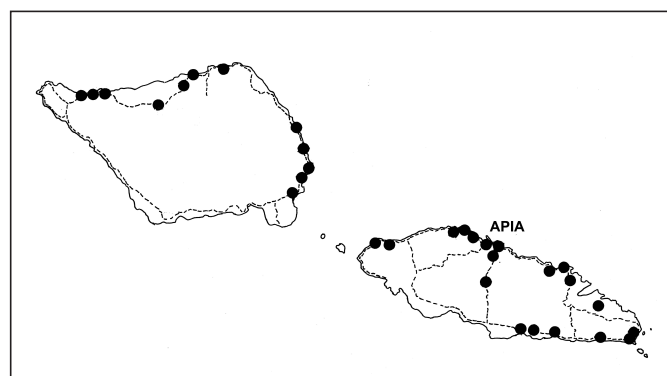
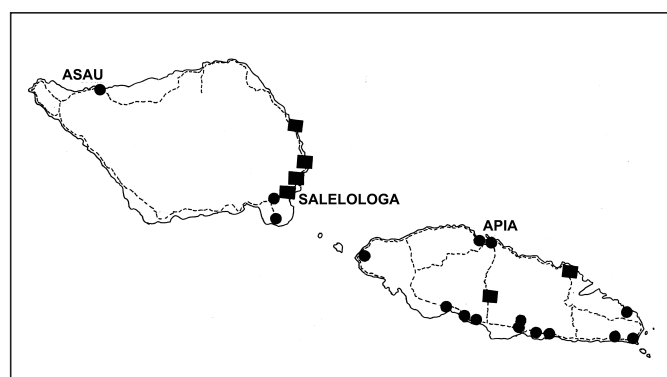
## Corrigendum

Corrections to figures and legends in McAllan, I.A.W.; Hobcroft, D. 2005. The further spread of introduced birds in Samoa. *Notornis* 52(1): 16-20

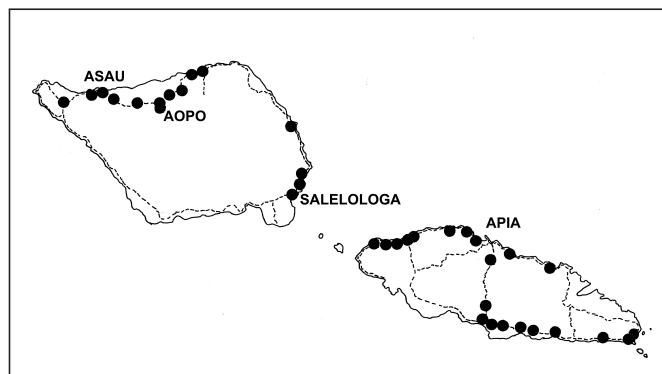
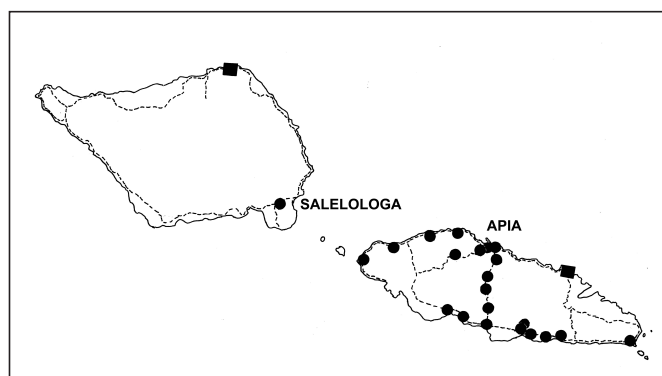
The correct association of figures and legends is as below.



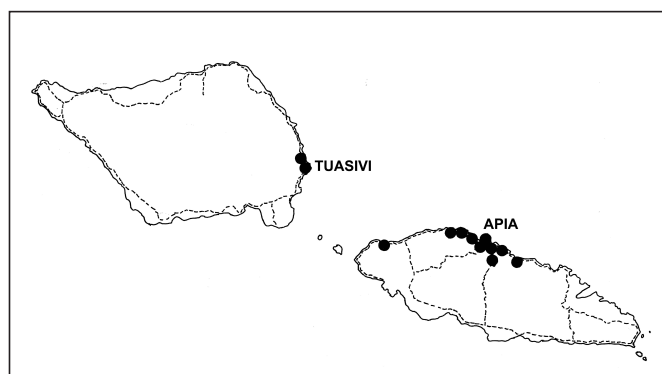
**Figure 1** Observations of rock dove in Samoa, November 2004. Dashed lines are major roads.



**Figure 2** Observations of red-vented bulbul in Samoa. Upper: Observations by Gill *et al.* (1993) (circles) and by Gill (1998) (rectangles); Lower: Observations by authors, November 2004.



**Figure 3** Observations of jungle myna in Samoa. Upper: Observations by Gill *et al.* (1993) (circles) and by Gill (1998) (rectangles); Lower: Observations by authors, November 2004.



**Figure 4** Observations of common myna in Samoa, November 2004.