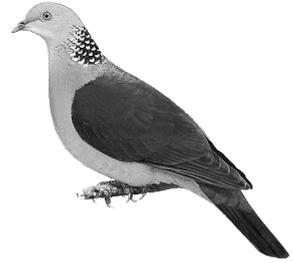


NILGIRI WOOD-PIGEON

Columba elphinstonii

Critical —
Endangered —
Vulnerable C1



This pigeon qualifies as Vulnerable owing to its small, declining population, as a result of widespread destruction of its forest habitat.

DISTRIBUTION The Nilgiri Wood-pigeon is one of 16 bird species endemic to the Western Ghats, India, and is restricted to the moist evergreen biotope (Ali and Ripley 1968–1998, Stattersfield *et al.* 1998). It occurs from Kerala northwards to about 19°N including the Anaimalai hills, the Nilgiri hills and the hills of western Karnataka, Goa and Maharashtra (Baker 1922–1930, Ali and Ripley 1968–1998). Although Whistler and Kinnear (1931–1937) thought it did not occur in Wynaad, it has subsequently been found in the Wynaad Ghats (Zacharias and Gaston 1999) and Wynaad district, Kerala (Uthaman 1993). Records are from:

■ **INDIA** ■ **Maharashtra** **Amboli**, one, 600 m, May 1994 (Uttangi 1994b); **Borivli National Park**, Salsette island, one, November 1973 (Daniel and Amladi 1974); **Bhimashankar**, Pune, September 1948 (specimen in BNHS, Abdulali 1968–1996), April–June 1994 (Gole 1994); **Matheran**, one, April 1944 (Ali and Abdulali 1945), 1994–1996 (Gole 1994, 1996); **Pune**, undated (Vyas 1967), and nearby at Singhad, April–June 1994 (Gole 1994, 1996); **Mahabaleshwar**, Khandala, along the hills, but rare, undated (Fairbank 1871), listed (Fairbank 1921), one, April 1986 (P. Bradbeer *in litt.* 1999), 1994–1996 (Gole 1994, 1996), this presumably being the “Khandala Ghats” mentioned as part of the species’s range by Murray (1889); **Durga Vadi**, one, undated (Vidal 1880); **Satara**, Kirma valley, December 1912 (specimen in BNHS, Abdulali 1968–1996); **Chandoli**, 1994–1996 (Gole 1996); **Radhanagari**, 1994–1996 (Gole 1996);

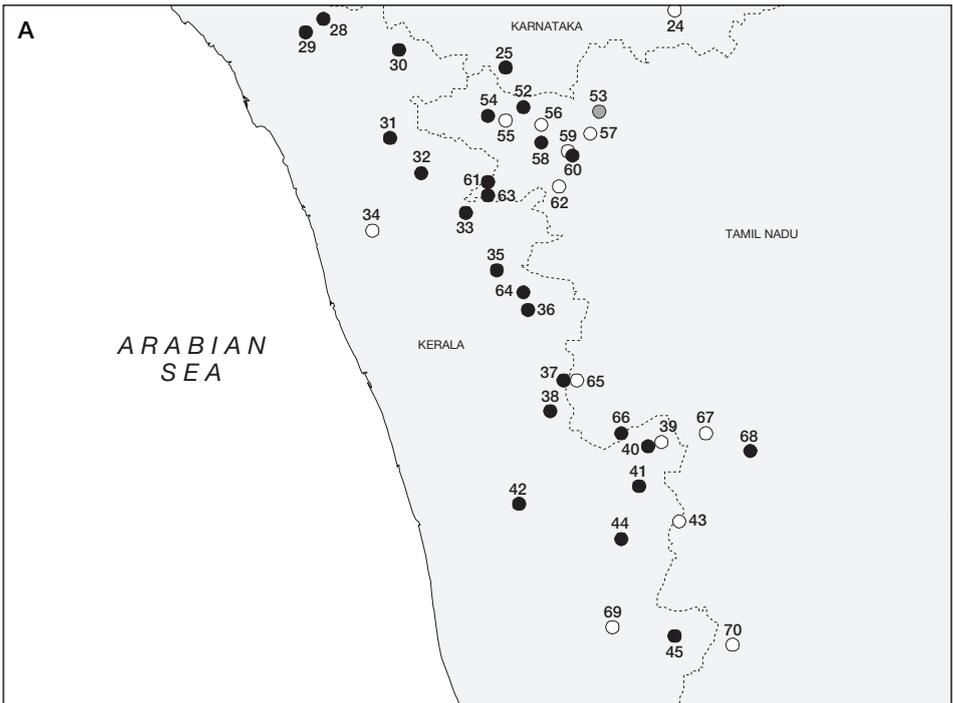
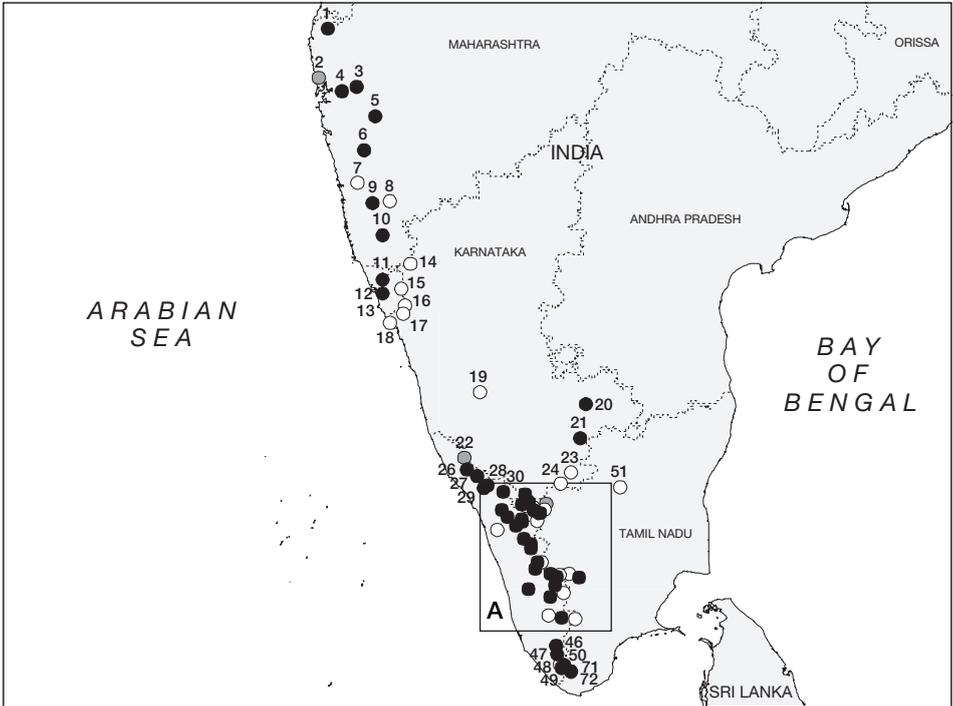
■ **Goa** **Bondla Wildlife Sanctuary**, singles, November 1997, November 1998 (P. Holt *in litt.* 1999); **Bhagwan Mahavir National Park** (previously Molem Wildlife Sanctuary), one male at Colem, January 1969 (Saha and Dasgupta 1992), undated (Grubh and Ali 1976), two, March 1987 (Watts 1987), not recorded during a survey in March 1992 by (Vijayan *et al.* 1992), seven at Molem, November 1997 (P. Holt *in litt.* 1999), also at Dudh Sagar waterfall, on the Colem–Madgaum railway, two, March 1987 (B. Watts *in litt.* 1999) and at Tamdi Surla, near Molem, one, February 1998, six, November 1998 (P. Holt *in litt.* 1999); **Canacona**, undated (Grubh and Ali 1976);

■ **Karnataka** **Belgaum**, “on the crest of the Ghats”, undated (MacGregor 1887); **Castle Rock**, Kanara, May 1914 (specimen in BNHS, *J. Bombay Nat. Hist. Soc.* 23: 384), and, presumably in the same area, at Digi (near the Goa border), where reportedly common, undated (Davidson 1898a); **Kumbharwada**, undated (Davidson 1898a); **Anshi** (Anshi National Park), undated (Davidson 1898a), and again around 1994 (Uttangi 1994b); **Karwar**, April 1924, April 1925 (two eggs in BMNH); **Kemmanugundi**, near Chikkamagalore, Bababudan hills, 1,350 m, January 1940 (Ali and Whistler 1942–1943); **Nandi hills**, c.60 km north-east of Bangalore, 1,450 m, October 1987, August 1990, October 1991, November 1991, November 1992 (Subramanya *et al.* 1994); **Bannerghatta National Park**, near Bangalore, 950 m, June 1983 (George 1994); **Brahmagiri**, far south of Coorg, April 1881, when “comparatively common” (three specimens in AMNH, BMNH; Davison 1883), but, although considered likely to be present “all along the Coorg Ghats” around 1950 (Betts 1951), not recorded subsequently; **Devarbetta hill**, 900 m, December 1939 (Ali and Whistler 1942–1943); **Bellaji**, Honnametti and Edbuthi (Edluth), Biligirirangan hills, 1,300–2,000 m, April–May (possibly

also July) 1934 (Ali and Whistler 1942–1943, specimens in BMNH, BNHS, USNM; see also Anon. 1915); **Bandipur National Park**, 24, January 1996 (D. Herter *in litt.* 1999); Juggulbet (untraced), Kanara, undated (Davidson 1898a);

■ **Kerala Konnakad**, 400–800 m, “uncommon”, 1973–1997 (Zacharias and Gaston 1999); **Thirunelli**, May 1996 (Prasad *et al.* 1998a), “common”, 1973–1997 (Zacharias and Gaston 1999); **Aralam Wildlife Sanctuary**, 1995–1997 (R. Sugathan *per L. Vijayan in litt.* 1998); **Periya Ghats**, 400–700 m, “uncommon”, 1973–1997 (Zacharias and Gaston 1999); **Wynaad district**, specifically at Wynaad Wildlife Sanctuary, one, December 1991 or January 1992 (Uthaman 1993), presumably including the records from Wynaad, 1985–1988 (Zacharias and Gaston 1993); **Wynaad Ghats**, 600–1,000 m, “common”, 1973–1997 (Zacharias and Gaston 1999); **Nilambur**, uncommon, 1973–1997 (Zacharias and Gaston 1999), between Mancheri and Meenmutti, 1995–1997 (Prasad *et al.* 1998a), and at nearby Thalichola, Nilambur forest division, 1995–1997 (Prasad *et al.* 1998a); **Silent Valley National Park**, undated (Jayson 1990), January–February 1992 (Vijayan *et al.* 1992), December 1996 (Vijayan *et al.* 1999), 1995–1997 (R. Sugathan *per L. Vijayan in litt.* 1998), “uncommon”, 1973–1997 (Zacharias and Gaston 1999); Kolathur (Kulattur), **Malappuram**, one female, December 1912 (specimen in BMNH; Whistler and Kinnear 1931–1937); **Dhoni**, 100–200 m, “uncommon”, 1973–1997 (Zacharias and Gaston 1999); Muthikulam Reserve Forest, Siruvani hills, **Palghat**, December 1995, May–June 1996 (Prasad *et al.* 1998a); **Nelliampathy hills**, sparsely in the period 1910–1920 (Kinloch 1921), and “uncommon” in 1973–1997 (Zacharias and Gaston 1999); **Parambikulam Wildlife Sanctuary**, 1976 (Vijayan 1978), 1995–1997 (R. Sugathan *per L. Vijayan in litt.* 1998); **Maraiyur**, 1,050 m, one, January 1933 (Ali and Whistler 1935–1937); **Eravikulam National Park** (Rajamalai National Park), 1995–1997 (R. Sugathan *per L. Vijayan in litt.* 1998); **Munnar**, 900–2,000 m, three, December 1994 or January 1995 (Gee 1995), singles, January 1996, December 1997 (P. Holt *in litt.* 1999), “uncommon”, 1973–1997 (Zacharias and Gaston 1999); **Thattakkad Bird Sanctuary**, 50 m, 1933 (Ali and Whistler 1935–1937), 1995–1997 (Sugathan and Varghese 1996, R. Sugathan *per L. Vijayan in litt.* 1998), 1973–1997 (Zacharias and Gaston 1999); **Santhanpara**, Cardamom hills, 1,050 m, one, January 1933 (Ali and Whistler 1935–1937); **Idukki Wildlife Sanctuary**, 1995–1997 (Prasad *et al.* 1998a, R. Sugathan *per L. Vijayan in litt.* 1998); **Pirmed** (Peermade, Pirmeed), undated (Ferguson and Bourdillon 1903–1904); **Periyar Sanctuary**, listed as rare, undated (Robertson and Jackson 1992), and common, undated (Srivastava *et al.* 1993), occurring at Mullakudy, where 50 birds were counted visiting a fruiting tree in 1976 (V. J. Rajan *in litt.* 1988), at Thekkady, where rare and observed only in November 1980 during a study in 1979–1981 (Vijayan 1984), and at Manakavala, Periyar lake, 2–4, September 1997 (S. H. M. Butchart *in litt.* 2000), generally considered “uncommon” in “Periyar West” and “common” in “Periyar East”, 1973–1997 (Zacharias and Gaston 1999); **Tenmalai**, 100–600 m, “uncommon”, 1973–1997 (Zacharias and Gaston 1999); **Shendurney Wildlife Sanctuary**, 1995–1997 (R. Sugathan *per L. Vijayan in litt.* 1998); **Mynall**, September–October 1874 (two specimens in BMNH, Ali and Whistler 1935–1937); **Agastiamalai** (Agasthyamalai), “Trivandrum forest division”, December 1995 (Prasad *et al.* 1998a), undated (Gaston and Zacharias 1996, Zacharias and Gaston 1999); **Peppara Wildlife Sanctuary**, 1995–1997 (R. Sugathan *per L. Vijayan in litt.* 1998); in the hills of Travancore, undated (Hume 1876b);

■ **Tamil Nadu Shevaroy hills** (Shevaroy), undated (Baker and Inglis 1930); **Mudumalai Wildlife Sanctuary**, Benna, recorded as rare between May 1994 and August 1995 (Gokula and Vijayan 1996); **Kodanad**, Kotagiri, September 1977 (specimen in BNHS); **Gudalur** (Guddalore), recorded only once in 1994 (V. Gokula verbally 1996); **Naduvattam** (Neddivittum), undated (specimen in MM), “very numerous”, March 1881 (specimen in BMNH, Davison 1883), July 1887 (specimen in MCML); **Kalhatti**, May 1947 (specimen in YPM); **Kotagiri** (Khotagherry), Nilgiris, June 1874, June 1877, March 1881 (three specimens in BMNH), April and June 1871 (three eggs in BMNH), and specifically at Kil Kotagiri, June 1918 (specimen in BMNH); **Udagamandalam** (Ootacamund, “Ooty”), May 1867 and



March 1881 (two specimens in BMNH), May 1892 and June 1902 (BMNH egg data), one male, February 1937 (Koelz 1947), November 1965 (specimen in BNHS), 7–10, December 1997 (H. Hendriks and P. Hines *in litt.* 1999), and nearby at Muthorai, up to c.15, January 1994 (Holt 1995) and Cairnhill Reserve Forest, three, February 1997 (A. Prasad *in litt.* 1999); **Wellington**, one, April–May 1866 (Bulger 1866); **Coonoor**, March 1873 (specimen in AMNH), November 1881 (specimen in BMNH), 1974–1976 (Khan 1977, 1978), three around “Dolphin’s Nose” and “Lamb’s Rock”, November 1994 (Gee 1995, B. Gee *in litt.* 1999); Mullikorai, near **Avalanche**, one, November–December 1994 (Gee 1995); Kundah, assumed to be **Kundah river**, March 1883 (specimen in AMNH); **upper Bhavani**, very rare in shola forests in the upper Nilgiris, 1994–1997 (Vijayan *et al.* 1999); **Siruvani hills** (Kerala/Tamil Nadu border), January 1995 and November 1996 (Vijayan *et al.* 1992, 1999), the former date specified as in the reserve forest at Pattiyar Rest House (Santharam 1999a), and in the Siruvani foothills, Coimbatore, recorded only once in 1995 during a study in 1995–1997 (C. Vekatraman verbally 1997); **Grass hills**, an outlier of the Anaimalai hills, undated (Williams 1937); Karian Shola, **Anaimalai hills** (Anai Malai hills), one, November 1991 (Kannan 1998), and at the Top Slip reserve, one, January 1993 (Kannan 1998); **Kukkai** (Kukal), Palni hills, common and nesting, May c.1886 (Terry 1887); **Kodaikanal**, Palni hills, 2,150 m, common, June 1877 (three specimens in BMNH; Fairbank 1887, Terry 1887, Ali and Whistler 1935–1937), common, c.2,200 m, September 1997 (S. H. M. Butchart *in litt.* 2000), and elsewhere in the Palni hills, undated (specimen in YPM), in the foothills, probably May 1955 (specimen in BNHS), and at Shenbagnur, May 1955 (specimen in BNHS); in the **High Wavy mountains**, Madura (Madurai) district, May 1917 (specimen in BNHS, Abdulali 1968–1998; also Whistler and Kinnear 1931–1937), and at unspecified localities in the same district, undated (Nichols 1943–1945); in the hills south of Travancore, undated (Ferguson and Bourdillon 1903–1904), this equating to the **Ashambu hills** where there are recent records from above Balamore, near **Muthukuzhi** (Muthukuly, Muthukaly), Kanyakumari district, c.800 m, flocks of 4–10, June 1996 (S. H. M. Butchart *in litt.* 2000); New Amarambalam Reserve Forest (untraced), 1992 (Vijayan *et al.* 1992); Kilmelford (untraced), 1938 (specimen in YPM).

There is one untraced locality from an unknown state: Anaikatti, undated (Whistler ms).

POPULATION Although this species was previously categorised as Near Threatened (Collar *et al.* 1994), recent assessments of declines in habitat (see Threats) have prompted greater concern for its status. It is generally not very sociable, so it does not reveal itself in large flocks as some pigeons do. While Sykes (1832) thought it “not gregarious”, it has been seen in flocks of 6–12 in January–February, but only as singles or pairs during the summer (Prasad *et al.* 1998a). Whistler and Kinnear (1931–1937) confirmed that it was usually found in pairs but that “numbers may collect when the fruits of various trees are in season”.

The distribution of Nilgiri Wood-pigeon *Columba elphinstonii* (maps opposite): (1) Amboli; (2) Borivli National Park; (3) Bhimashankar; (4) Matheran; (5) Pune; (6) Mahabaleshwar; (7) Durga Vadi; (8) Satara; (9) Chandoli; (10) Radhanagari; (11) Bondla Wildlife Sanctuary; (12) Bhagwan Mahavir National Park; (13) Canacona; (14) Belgaum; (15) Castle Rock; (16) Kumbharwada; (17) Anshi; (18) Karwar; (19) Kemmanugundi; (20) Nandi hills; (21) Bannerghatta National Park; (22) Brahmagiri; (23) Devarbetta hill; (24) Bellaji; (25) Bandipur National Park; (26) Konnakad; (27) Thirunelli; (28) Aralam Wildlife Sanctuary; (29) Periya ghats; (30) Wynaad district; (31) Wynaad ghats; (32) Nilambur; (33) Silent Valley National Park; (34) Malappuram; (35) Dhoni; (36) Palghat; (37) Nelliampathy hills; (38) Parambikulam Wildlife Sanctuary; (39) Maraiyur; (40) Eravikulam National Park; (41) Munnar; (42) Thattakkad Bird Sanctuary; (43) Santhanpara; (44) Idukki Wildlife Sanctuary; (45) Periyar Sanctuary; (46) Tenmalai; (47) Shendurney Wildlife Sanctuary; (48) Mynall; (49) Agastiamalai; (50) Peppara Wildlife Sanctuary; (51) Shevaroy hills; (52) Mudumalai Wildlife Sanctuary; (53) Kodanad; (54) Gudalur; (55) Naduvattam; (56) Kalhatti; (57) Kotagiri; (58) Udagamandalam; (59) Wellington; (60) Coonoor; (61) Avalanche; (62) Kundah river; (63) upper Bhavani; (64) Siruvani hills; (65) Grass hills; (66) Anaimalai hills; (67) Kukkai; (68) Kodaikanal; (69) Pirmed (not in sequence); (70) High Wavy mountains; (71) Muthukuzhi; (72) Ashambu hills.

○ Historical (pre-1950) ● Fairly recent (1950–1979) ● Recent (1980–present) □ Undated

There are many qualitative comments on status from throughout the species's range in the late nineteenth and early twentieth centuries. MacGregor (1887) found it "rare" on the crest of the Ghats in Belgaum district. Davidson (1898a) found it "rare" in north Kanara, but mentioned reports that it was "more common further north about Digi on the Portuguese frontier" (i.e. Goa). Further south it was thought to be "fairly common but not abundant" in Karnataka (Ali and Whistler 1942–1943), although it was probably not common in Coorg district during the early twentieth century, as Betts (1951) never encountered it. It was thought "common" above 1,200 m in the Nilgiris, Palnis and Travancore (Kerala) hills (Whistler and Kinnear 1931–1937). In the big sholas of the Palni hills (including Kodaikanal and Kukal) it was "common" (Terry 1887). Some 50 years later, however, it was classed as "uncommon" around Kodaikanal and in Madurai district (Nichols 1937, 1943–1945). Ferguson and Bourdillon (1903–1904) stated that it was "a common bird" of hills in Travancore (part of present day Kerala), while Ali and Whistler (1935–1937) later thought it "not uncommon" in the same region. It was common in small sholas in the Grass Hills but only occasional at lower elevation (Williams 1937). Sykes (1832) described it as a rare bird in dense woods of the Nilgiris. Davison (1883) did not encounter it in Wynaad or Mysore, but thought it "comparatively common" in the Brahmagiris and "very numerous" around Naduvattum. In the Nelliampathy hills it was "much rarer than the Imperial Pigeon" (evidently the Mountain Imperial Pigeon *Ducula badia*, described as "very common"), but found "sparingly on the higher hills" (Kinloch 1921).

There are currently no quantitative population estimates from any portion of its range. However, it appears to be locally distributed but still common at certain sites, particularly in mid-elevation moist forests in Kerala. The population seems to be at low density in most areas, and at high density only in a few patches of evergreen or semi-evergreen forests (Prasad *et al.* 1998a,b). In some 13 years of observations throughout Goa (beginning in 1980), Lainer (1999) encountered the species around 10 times at one "pocket of remnant semi-evergreen forest" and twice at another, prompting the conclusion that it was "a rather scarce, erratic visitor, possibly resident". In the 1990s it was "distributed in moderate numbers" (Gole 1996) with singles, pairs and small flocks "commonly observed" throughout the northern Western Ghats of Maharashtra wherever forest remained above 1,000 m (Gole 1994). It was thought possibly to be declining (Gole 1996). At Anshi National Park it was "very common" in 1994 (Uttangi 1994b). Five were recorded at Nandi hills in 1987, but only two were found on subsequent visits, suggesting that the species is uncommon at the site (Subramanya *et al.* 1994). It is a common resident in suitable shola habitat around Coonor (Khan 1978, 1980), but this vegetation type is patchily distributed so that the overall population of the species is probably not very high (L. Vijayan *in litt.* 1999). Flocks of 6–12 were seen in January–February 1996 in Agasthyamalai and Idukki regions (Prasad *et al.* 1998a,b). Singles or pairs were found in Silent Valley National Park and Siruvani Hills in April–May 1993–1995 (Vijayan *et al.* 1999). The population in the Kodaikanal area seems to have declined drastically during the 1980s (S. Balachandran verbally 1998). Although Ali and Ripley (1968–1998) reported that the species was widespread in the Anaimalai hills of Tamil Nadu and Kerala, Kannan (1998) thought it "rare" there, having only observed two individuals during two years' fieldwork (1991–1993), and concluded that it had probably "declined in numbers". However, Zacharias and Gaston (1999) encountered the species widely in Kerala and concluded that the state retained "substantial populations".

ECOLOGY Habitat The Nilgiri Wood-pigeon is confined to evergreen forest at intermediate altitudes, with "cardomom sholas with their tall shade trees... a favourite habitat" (Ali and Whistler 1942–1943, Ali and Ripley 1968–1998); it sits "quietly in dense trees" (Nichols 1937) in sholas and other forests (Sykes 1832, Blyth 1845; see Remarks 1). The isolated population at Nandi hills was confined to a large patch of evergreen vegetation dominated by *Coffea* and shrubs, where birds were most frequently seen during the mornings and evenings,

presumably foraging, and tall trees with dense canopies were used for midday and night-time roosting (Subramanya *et al.* 1994). While the species was common in wooded sholas in the Nilgiris, it was absent from nearby tea and acacia plantations, and only occasionally observed in eucalyptus (Khan 1980). It occupies a wide altitudinal range, chiefly in the hills up to 2,000 m, but also down to 50 m in the lowlands (Ali and Whistler 1935–1937). It is commonest in the evergreen and semi-evergreen forests at medium to high elevations, and is only infrequently encountered in the lowlands (Williams 1937, Prasad *et al.* 1998a, Vijayan *et al.* 1999). Birds have been observed roosting on the roof-trusses of a small hut (Williams 1937). Their habits are apparently like those of imperial-pigeons *Ducula [badia?]* but they descend more readily to the ground (Robertson and Jackson 1992). Both Jerdon (1862–1864) and Davison (1883) noted that they sometimes feed on the ground outside forests.

Food The species feeds largely on various fruits, commonly *Randia dumetorum*, either in trees or on the ground, as well as on berries, buds and even snails (Goodwin 1967, T. C. Jerdon in Ali and Ripley 1968–1998). Blyth (1845) found fruit pits in the stomach of one bird, and a flock was seen feeding on a fruiting bilberry tree (Williams 1937).

Breeding The species breeds from March to July, with most eggs laid in May and June (Hume and Oates 1889–1890, Baker 1932–1935, Goodwin 1967), although Morgan (1875) emphasised March–April. It builds the usual “slight platform” of sticks common to the genus on branches of high trees in dense forest, or in thorny bushes or masses of cane, usually 2.5–5 m from the ground (Morgan 1875, Hume and Oates 1889–1890, Murray 1889). The clutch consists of a single egg (Morgan 1875, Terry 1887, Hume and Oates 1889–1890).

Migration Although considered resident in the Travancore hills (in present-day Kerala) by F. W. Bourdillon (in Hume 1876b), and listed as an “erratic visitor, possibly resident” in Goa (Lainer 1999), Davison (1883) discovered that it “moves about a good deal, and a shola that may be full of them one week will not contain a single specimen the following week”. Similarly, Fairbank (1877) noted that at Kodaikanal birds were “scarce in May, but came by the dozen in June to feed on some kinds of fruit that were then ripening”. In some regions these movements follow a roughly seasonal pattern: in the Nilgiris, for instance, Primrose (1939) reported that “barring a few odd pairs that are permanent residents and breed in suitable Sholas in this vicinity, the remainder leave these parts in November”. Whether seasonal or erratic, these local movements apparently follow the fruiting and budding of preferred trees (Baker and Inglis 1930, Whistler and Kinnear 1931–1937). Birds probably also move from to lower regions in cold weather (Ali and Ripley 1968–1998).

THREATS The Nilgiri Wood-pigeon is one of (now) four threatened members of the suite of 16 bird species that are entirely restricted to the “Western Ghats Endemic Bird Area”, threats and conservation measures in which are profiled by Stattersfield *et al.* (1998).

Habitat loss and disturbance Conversion of forest into plantations, crops, reservoirs and settlements has brought about extensive damage and fragmentation of natural vegetation in the Western Ghats. In the last few decades India has lost about 30% of its forests (Kothari 1994). In the northern Western Ghats of Maharashtra, forests are “fast declining” in extent and increasingly disturbed because of shifting cultivation, collection of fuelwood, building materials, non-timber forest products, cattle-grazing and road-building (Gole 1996). In addition, reservoirs have inundated large areas of forest, and mining concessions threaten further habitat (Gole 1996). A recent study by Prasad *et al.* (1998a,b) in Kerala determined a mean annual loss of 0.28% based on data collected over three decades (1961–1988); for the entire state there was a substantial decline of 47% of evergreen/semi-evergreen forest during the three decades, while there was an increase of 6 and 7.5% respectively of plantation and deciduous forest cover (Prasad *et al.* 1998a,b). The Bhagwan Mahavir National Park in Goa is being increasingly degraded through “government sponsored tourism” (Lainer 1999). Vast areas of the Anaimalai hills have been denuded or selectively logged since the area first began

to be cleared for tea plantations and timber in the 1800s (Kannan 1998). Moreover, “destruction continues unabated” with over 500 mature trees felled on the Valparai plateau in 1992 and recent proposals to expand the area under tea cultivation by 3,350 ha (Kannan 1998).

Hunting Hunting pressure for either food or sport was heavy, at least during British rule (“they were so much persecuted by everyone who could get a gun”: Fairbank 1877), although “the large numbers shot annually” did not appear to reduce the population (Primrose 1939). At present most of the birds in India are protected under the Wildlife Act and hunting in general is uncommon. Hunting remains a common activity in Goa, only controlled in the decade after liberation from the Portuguese in 1961 by a chronic lack of ammunition (Lainer 1999).

MEASURES TAKEN The species occurs in Silent Valley National Park (89.5 km²), Borivli National Park, Bondla Wildlife Sanctuary, Bhagwan Mahavir National Park (240 km²), Mudumalai Wildlife Sanctuary, Thattakkad Bird Sanctuary, Idukki Wildlife Sanctuary, Parambikulam Wildlife Sanctuary, Peppara Wildlife Sanctuary, Shendurney Wildlife Sanctuary, Aralam Wildlife Sanctuary, Eravikulam National Park and Wynaad Wildlife Sanctuary. In the Anaimalai hills, it occurs in both the Indira Gandhi (Anaimalai) Wildlife Sanctuary and Parambikulam Wildlife Sanctuary (Kannan 1998). In Maharashtra, Chandoli, Bhimashankar and Radhanagari forests are apparently designated as “animal and bird sanctuaries” but remain under heavy pressure (Gole 1996). Eravikulam National Park in Kerala apparently supports “substantial areas” of forest (Zacharias and Gaston 1999).

Research Surveys, supported in part by the Oriental Bird Club conservation fund, have focused on the northern (Gole 1996) and southern Western Ghats (e.g. Vijayan *et al.* 1992, 1999).

MEASURES PROPOSED *Protected areas* Important sites in the northern Western Ghats of Maharashtra should receive effective protection; appropriate sites would appear to be Mahabaleshwar, Matheran, Chandoli and Radhanagari (Gole 1996). Although some of these areas already receive nominal protection, this needs strengthening and proper management (Gole 1996). Detailed studies of the forest divisions of Kerala assessed habitat degradation and biodiversity values (see Nair 1991) and recommended key areas for protection and proper management planning for the conservation of endemic birds and large mammals (Prasad *et al.* 1998a,b); however, the nomadic behaviour of the species suggests that site-based conservation strategies may only be successful if a sufficient number of sites is protected for it to follow seasonal patterns of fruit ripening (and for this a programme of research into the ecology of the species is required).

Habitat management Conversion of forests to plantations must be curtailed, and restoration of disturbed habitats is proposed through the participation of local communities (Vijayan *et al.* 1997). In Maharashtra, Gole (1996) suggested involving local people such as wood-cutters in participatory forest management, allowing sustainable exploitation, promoting tree planting and preventing undue habitat degradation. Commercial development should be controlled in the state, with habitat restoration promoted as an appropriate mitigating measure (Gole 1996). Sites of religious significance receive partial protection in Maharashtra, but this should be extended to ensure that they also function as natural reserves (Gole 1996).

Awareness campaigns A strong nature education programme is required in Maharashtra, and doubtless elsewhere in the range of this species (Gole 1996). As such, elements of the school curriculum should be developed, and illustrated literature and posters should be distributed, especially at tourist sites in the hills (Gole 1996).

REMARKS (1) Use of moist deciduous forest has also been reported (Goodwin 1967) but this requires confirmation.