MONK PARAKEETS IN THE UNITED STATES: POPULATION GROWTH AND REGIONAL PATTERNS OF DISTRIBUTION

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ABSTRACT: Records from Christmas Bird Counts were summarized to assess population growth of the Monk Parakeet (*Myiopsitta monachus*) in the United States from 1975 to 1996. Population growth over this period fits an exponential model of population growth with a current annual rate of increase of 12.9% and a doubling time of 5.4 years. Since 1990, however, population growth on a national scale has slowed considerably, suggesting that the species may be approaching a carrying capacity. In contrast to the results across the entire United States, the population of Monk Parakeets in northeastern Illinois has dramatically increased in numbers within the last decade. In this region, the Hyde Park, Chicago population appears to be acting as a source from which other areas are colonized. The Monk Parakeet is known to have caused damage to fruit crops in Florida, and they can be a nuisance species to local utility companies when they build their nests on power transformers. Nevertheless, such damage is highly localized and, on a national scale, there is no evidence to date that Monk Parakeets should be considered a pest species and subject to widespread control. The initiation of detailed studies of a banded population of this species is recommended.

KEY WORDS: Monk Parakeets, introduced species, parrots, population growth, exponential growth

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INTRODUCTION

Introduced and naturalized parrots are an increasingly common part of local avifaunas in some regions in the United States. In southern California, for example, there are now 10 species of naturalized parrots and population estimates put the numbers of individuals at 2,500 to 3,000 (all species combined; Garrett 1997). As another example, in Florida, on the 1996-1997 Christmas Bird Count a total of 1,761 individuals of 16 species of parrots were reported. It is not yet known how many of these 16 species are naturalized in Florida but it is likely to be many of them.

Without exception, the most abundant and widely distributed of the naturalized parrots in the United States is the Monk Parakeet (*Myiopsitta monachus*). This species became naturalized in the United States in the late 1960s (Lever 1987) and is now resident in 76 localities in 15 states and is experiencing exponential population growth (Van Bael and Pruett-Jones 1996). Monk Parakeets also have become naturalized in Europe and are increasing in numbers there as well (Sol et al. 1997).

There is greater concern about the Monk Parakeet than other naturalized parrots because of the possibility that it may become an agricultural pest, as it is reported to be in its native range (Bump 1971; Bucher and Bedano 1976; but see Bucher 1984). The Monk Parakeet was the focus of an eradication campaign by the United States Fish and Wildlife Service (USFWS) in the 1970s, a program that reduced its population by approximately one-half (Neidermyer and Hickey 1977). The Monk Parakeet is also of interest from a behavioral perspective because it is the only species of parrot to build its own nest and exhibit cooperative breeding (Sol et al. 1997; Eberhard 1998; Spreyer and Bucher 1998).

In this paper, the authors analyze trends in population growth of the Monk Parakeet in the United States from the period 1975 to 1996, population growth in one specific community, Hyde Park, Chicago, and the regional pattern of distribution in northeastern Illinois. This work updates the surveys conducted by Hyman and Pruett-Jones (1995) and Van Bael and Pruett-Jones (1996), extending their analyses up to 1996. The authors also discuss evidence relating to the status of the Monk Parakeet as a pest species and argue that such designation is unwarranted at the national level.

METHODS

Population Censuses

The use of Christmas Bird Counts (CBC) records published in American Birds (now Field Notes) extends the analysis presented in Van Bael and Pruett-Jones (1996). Briefly, CBC records from the 1975-1976 count (the year following the end of the USFWS control program) to the 1996-1997 count were summarized. In examining these data for the 1972-1973, 1981-1982, 1986-1987, and 1992-1993 through the 1996-1997 counts, records were checked for every reporting locality in the United States. For the intervening years, records were checked for every locality in all states that reported at least one Monk Parakeet during at least one of the counts listed above. For each CBC locality, the total number of birds reported as well as the number of party hours was noted. For some years, Monk Parakeets were recorded during the "count week" at a given locality, but no birds were actually recorded on the formal count day. In tabulating numbers of individuals recorded, "count week" records were counted as one parakeet at that given locality.

The rate of population growth was calculated using the standard equation defining exponential growth $N_{t+1} = N_t e^{rt}$ where N_{t+1} is the population size at time t+1, N_t is the population size at time t, r is the rate of population growth, t is the time interval, and e is the natural logarithm base. To calculate the intrinsic rate of population growth, r, this equation can be rewritten as $r = (\ln N_{t+1} - \ln Nt)/t$. For each one-year time interval

beginning in 1975 (the year the USFWS control program ended) r was calculated. A plot of r versus population size indicates whether a population is expanding, declining, or has reached a stable equilibrium size. To calculate the time interval for a population to double in size, the equation above defining r can be rewritten as $t = \ln 2/r$.

Regional Distribution

To quantify regional distribution and abundance, during January and February 1998 the authors attempted to locate all Monk Parakeet nests in the Hyde Park community of Chicago, as well as in northeastern Illinois, from the Wisconsin border to the north to the Indiana border to the southeast. Known sites, such as the Hyde Park area, were searched systematically and thoroughly. Other sites were discovered through data collected on Christmas Bird Counts, and correspondence with Chicago area birdwatchers. All sites reported were visited and the number of nesting structures and nest chambers recorded. Although an attempt was made to find every single nesting structure on the surveys, the limited time spent in some areas prevented accurate counts of individual birds.

In keeping with the terminology introduced by Hyman and Pruett-Jones (1995), the authors refer to a nesting structure as a stick structure containing one or more chambers, and a nesting chamber as a cavity that birds were known or suspected to use for nesting or roosting.

RESULTS

Population Growth

When viewed over the entire 22 year period, 1975 to 1996, population growth of the Monk Parakeet in the United States has been positive and exponential in nature (Figure 1, Figure 2, Table 1). There has, however, been considerable yearly variation in growth rates. Population data for three periods were analyzed separately as shown in Figure 1 (Period 1, 1975 to 1981; Period 2, 1982 to 1989; Period 3, 1990 to 1996; these periods were determined by visual inspection of the data). The results of the separate analyses are shown in Figure 1 and Table 1.

During Period 1, immediately after the USFWS control program ended, the Monk Parakeet experienced marginally positive growth (Table 1). This trend ended abruptly in the early 1980s and was followed by phenomenal growth rates for almost a decade (Period 2) in which the population increased on average 33.6% per year (Table 1). Lastly, during the 1990s, population growth slowed considerably, and was not statistically significant over time (Figure 1). The rates of population growth during Periods 2 and 3 (the slopes of the regressions) were significantly different (ANCOVA, $F = 20.07$, $P < 0.001$).

A plot of the intrinsic rate of population growth, r, versus population size (Figure 2) reveals the same pattern of recent declining population growth shown in Figure 1. Over the last seven years, from 1990 to 1996, the intrinsic rate of growth has been negative or very close to zero for five of these years (Figure 2).

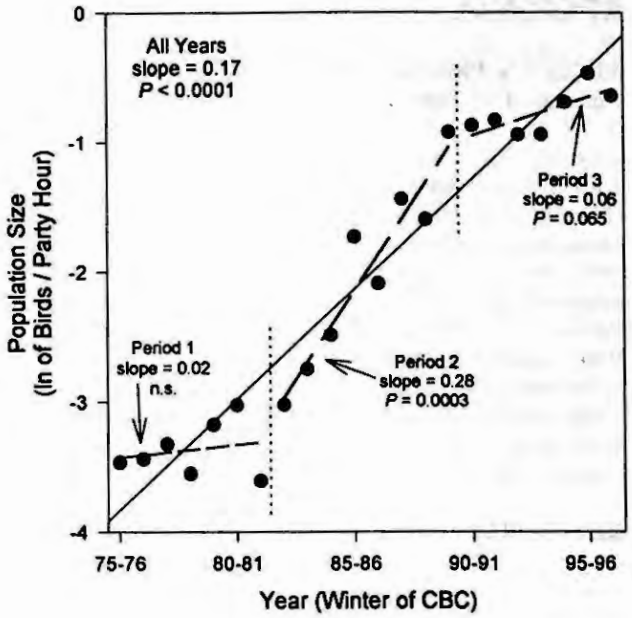

Figure 1. Population growth of the Monk Parakeet in the United States, 1975 to 1996. Shown is the regression of population size (ln of birds/party hours reported on annual Christmas Bird Counts) by year for the entire period (solid line) and for three separate periods (hatched lines). The vertical dotted lines indicate the separation of the periods.

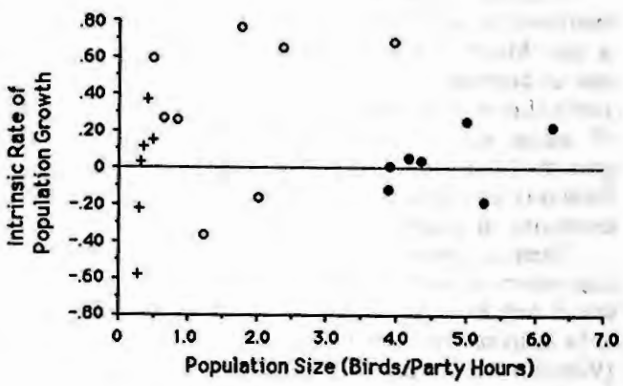

Figure 2. Plot of intrinsic rate of population growth of Monk Parakeets in the United States for the period 1975 to 1996. The different symbols refer to the different periods illustrated in Figure 1 and listed in Table 1; crosses refer to the years in Period 1, open circles the years in Period 2, and the solid dots the years in Period 3.

Table 1. Population growth of Monk Parakeets in the United States, 1975 to 1996.

Period	Number of Years	Regression Slope	F	R^2	P	r[1]	t[2]
Overall	22	0.17	235.13	0.918	<0.0001	0.129	5.4
1 (1975 to 1981)	7	0.02	0.21	0.150	0.6641	0.023	30.1
2 (1982 to 1989)	8	0.28	55.66	0.886	0.0003	0.336	2.1
3 (1990 to 1996)	7	0.06	5.57	0.432	0.0647	0.040	17.4

[1]The intrinsic rate, r, of population growth.
[2]The time, t, for the population to double in size.

Within the Hyde Park, Chicago community, population growth of Monk Parakeets has been dramatic, and opposite the recent trend for the nation as a whole. In 1992, Hyman and Pruett-Jones (1995) counted 29 nesting chambers and a total of 64 birds. In 1993, approximately 95 birds were counted. In 1995, 85 nesting chambers were counted for an approximate population size of 170. In January 1997, 104 nesting chambers were counted for an approximate population size of 208 birds. The increase from 64 birds in 1992 to approximately 200 birds in 1997 represents an annual population growth rate of 22.8% with a population doubling time of just 3.05 years.

Regional Distribution

In northeastern Illinois, Monk Parakeets nest in six different sites stretching 150 km along the western shore of Lake Michigan (Figure 3). At two additional areas, Carol Stream and Addison, birds are regularly seen but no nesting structures are known. In one of these areas, Carol Stream, the absence of nests is recent, and due to both destruction of nests by the local utility company and to the natural felling by storm of a tree in which a large nest was located. With the exception of Zion (where there is one historical nest that is not currently active), all of the areas where the parakeets are nesting support multiple nesting structures and several to many pairs of birds (Figure 3). The dispersion of nests statistically was not analyzed, but it is evident from visual inspection that the dispersion is highly clumped (Figure 3).

DISCUSSION

The conclusion that one reaches about population growth of Monk Parakeets depends on the time frame and region under consideration. From 1975 to 1996, the population increased exponentially in the United States (Figure 1). Nevertheless, records for the last seven years (1990 to 1996) reveal that population growth has slowed considerably, and no longer shows a statistically significant increase (Figure 1).

Within one particular community, Hyde Park, Chicago, however, population growth has continued unabated, especially over the last five years. The observed population growth in Hyde Park has not been mirrored by continued increases in the numbers of birds reported on Chicago area Christmas Bird Counts (CBC). These numbers have fluctuated between 5 to 35 since 1990. The reason for this difference is that the CBC count circles do not encompass the Hyde Park community.

This discrepancy in counts (actual versus CBC records) for the Chicago area illustrates the magnitude of the error of CBC data in estimating total population size. The 1996-1997 count of 1,804 individuals in the United States could be as little as 5 to 10% of the total number of parakeets. For the Chicago area, the CBC counts have counted between 5 to 20% (depending on the year) of the total number of birds actually known in Hyde Park.

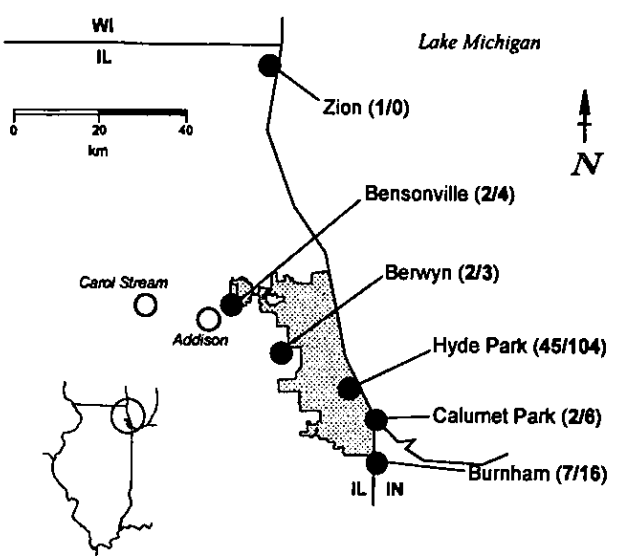

Figure 3. Distribution of Monk Parakeets in northeastern Illinois. Inset shows a map of Illinois and the region covered, from Wisconsin to the north to Indiana to the southeast. Solid dots indicate sites where Monk Parakeet nests are known (numbers in parentheses indicate the number of nesting structures/number of nest chambers at that site; see text for definition of terms). Open circles indicates sites where birds are known to occur but at which no nests are currently known.

In northeastern Illinois, the distribution of parakeets appears to be regionally clumped. The abundance of birds at different localities suggests that the Hyde Park area is acting as a source population for the other colonies. As one moves away from Hyde Park, the abundance of parakeets drops.

Concern over the population of Monk Parakeets in the United States stems from their reputation as an agricultural pest in Argentina. There is, however, an increasing belief that this reputation is overstated and undocumented (Bucher 1984; Spreyer and Bucher 1998). Within the United States, the Monk Parakeet is known to cause localized damage to fruit crops in Florida (A. Van Doorn, pers. comm.) and is a nuisance species in many areas because of the tendency of birds to build their nests on power transformers (personal observations). In Hyde Park, Chicago a large nest built on a power transformer caused an electrical short and a resulting fire. The local utility company removed this nest. The authors have been told through correspondence that utility companies in Florida and Texas regularly destroy the nests of Monk Parakeets that are built on transformers or, in some cases, telephone poles.

Such problems as localized damage to crops and nests on power transformers are significant, but should not be the basis of widespread concern. These problems can be appropriately and efficiently dealt with on a local level and do not, in the authors' opinion, justify state-wide or national policies of eradication or control.

Nevertheless, detailed studies on foraging habits, home range, and dispersal of Monk Parakeets have yet to be conducted in the United States and must be undertaken to accurately assess the potential threat of the species. That the Monk Parakeet is becoming a common species in many parts of the United States is no longer in doubt. Whether it will be viewed as a benign and welcome addition to local avifaunas, or as a serious pest species has not yet been determined.

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