Rates of "Peent" Calls by American Woodcocks: the Seven Percent Solution

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In the spring, male American Woodcocks (*Scolopax minor*) produce a recognizable vocalization, often described as a "peent", while they are on the ground. Woodcocks supplement this vocal behaviour with flights and flight calls in order to attract mates (Stap 1995). The "peent" calls have been used to census woodcock populations (Shissler and Samuel 1985, Sauer and Bortner 1991). Also, there has been some effort to determine if the calls are sufficiently distinct to permit identification of individual woodcocks (Samuel and Beightol 1972, Beightol and Samuel 1973, Bourgeois and Couture 1977, Weir and Graves 1982).

The purposes of this study were to look at the rate of singing in the spring and to examine possible differences in rates of song production among males. I also wanted to examine how the woodcock's song strategy is used during the mating season.

During the spring of 1998, I located six male woodcocks by their songs and flight displays in Dufferin County, Ontario, which is well within the known breeding range of the species (Lumsden 1987, James 1991). Five males were located in Mono Cliffs Provincial Park (44° 03' N, 80° 04' W), about 10 km northwest of Orangeville. Generally, the territories were located on abandoned farmland in early stages of forest succession, dominated by hawthorns (*Crataegus* spp.), Trembling Aspen (*Populus tremuloides*), and Apple (*Malus pumila*) (Lindsay 1991).

I recorded data from 18 April 1998, not long after the birds arrived on territory, until 12 May 1998. For each of the six males, I counted the number of "peent" calls produced during ten 30-second periods in the peak evening singing period (about 30 minutes prior to complete darkness; approximately 2030–2100h EDT early in the season, becoming progressively later during the study period). For each territorial bird, I recorded singing rates on two evenings.

Results

Woodcocks vocalized and flew for about 30 minutes just prior to complete darkness. The number of vocalizations ranged from 7 to 13 per 30-second count interval (Table 1). The median and mean numbers of songs per count interval both were 10. During the peak singing period, the rates of song production were relatively constant, as indicated by relatively low coefficients of variation [(standard deviation/mean) x 100] ranging from 8% to 14%.

Table 1: Singing rates (average # songs/30 seconds) and coefficients of variation (%) of American Woodcocks at six sites in Dufferin County, Ontario, on two nights.

	Day 1		Day 2	
Site	**Av. # Songs/30 s**	**CV**	**Av. # Songs/30 s**	**CV**
Barn Ruin	8.9	8.3	9.2	8.6
Survival Field	10.1	9.9	10.8	9.8
Bat Field	10.1	13.6	11.1	13.1
Parking Lot	9.0	10.5	9.6	10.0
DGH Field	10.7	10.8	9.4	12.5
20th Sideroad	9.4	9.8	10.8	10.5
Mean	9.7	10.5	10.2	10.8

There were some among-bird differences in the numbers of songs produced per 30-second period among the six males under study (Table 1). I used a Kruskal-Wallis test to evaluate among-bird differences, combining data from the two nights for each bird. This statistical test detected significant ($p < 0.01$) differences among singing rates of the six birds.

Discussion

My estimates of woodcock "peenting" rates are comparable with those in other published studies. Keppie and Whiting (1994) cited an average "peenting" rate of 19.3 "peents"/minute and a coefficient of variation of 33%. They noted an average duration of 0.2 seconds/"peent".

The "peent" call that forms the basis of this study is one of four principal sounds produced by male woodcocks during their courtship ritual. The two other main sounds are a "chirping" produced during the aerial flight and a "twitter" produced by the wings (Samuel and Beightol 1973).

Vocalizations by birds usually serve one of two purposes: to proclaim themselves by advertising their species and sex, thereby attracting a mate and maintaining that bond; and to establish and maintain a territory (Pettingill 1970, Catchpole and Slater 1995). Samuel and Beightol (1973) interpreted the "peent" as largely functioning in advertisement, announcement, and warning. Further, Catchpole and Slater (1995) predicted that if a song is to attract a mate, then it is best to transmit over as a wide an area as possible in the appropriate habitat. They noted that producing sound, particularly low-pitched sound, is costly, both in terms of energy expenditure and in the possibility that a predator might be attracted. Weary et al. (1992) alluded to various neurological and physiological costs that could limit the size of a bird's vocal repertoire.

The woodcock's "peent" calls have a relatively low frequency, averaging about 3.5–4.0 kHz. Singing posts in the study area were ground sites within generally open fields with low, shrubby vegetation. Cosens and Falls (1984) found that, in grasslands, the "ground effect" strongly attenuated vocal frequencies below 2 kHz. Such low-pitched sounds are particularly energetically expensive to produce, although, at the upper frequencies, they propagate rather well.

For many passerine bird species, maximum transmission can be achieved by assuming a high singing post. Alternatively, woodcocks achieve that wide transmission and minimize attenuation by physically moving around their singing ground, and through mating flights and accompanying vocalizations which help to maximize their conspicuousness (Pettingill 1970). Woodcocks also can reduce the problem of loss of their signals through the high rate of repetition and consistency of the "peent" call.

Woodcocks also may have to deal with the possible impairment of their vocalization by the songs of sympatric birds. This may decrease the alertness of the receiving bird and is probably maximized in an acoustically rich natural environment (Bremond 1978). Woodcocks begin their vocalizations and flights 20 to 30 minutes after sunset (Wishart and Bider 1977) when their main acoustic competitor in that time, on my study area, is the American Robin (*Turdus migratorius*). Consequently, the most common time for woodcock vocal behaviour is when their acoustical competition is minimal. As well, Samuel and Beightol (1973) suggested that the "peent" is used by woodcocks at dusk and dawn when visual cues would be less efficient in transmitting information.

One of the original goals in looking at "peent" calls was to examine if individual woodcocks could be distinguished, based solely on the characteristics of the "peent" calls. However, Samuel and Beightol (1972), Thomas and Dilworth (1980), and Weir and Graves (1982) expressed reservations about the usefulness of using only "peent" calls, largely because of considerable within-bird variation in calls.

If the average song duration of 0.2 seconds is used (Keppie and Whiting 1994), along with an average of 10 songs per 30-second period, then woodcocks broadcast during about 7% (ranging from 4.7% to 8.7%) of their potential terrestrial song time. In other words, only about 7% of the woodcock's terrestrial singing time is actually spent in vocalizations. Hartshorne (1992) related the time intervals between successive songs to the sequential versatility of the songs.

Finally, the mixture of calling with flights and flight calls provides male woodcocks with the means to attract females to their territories. Further study should be able to quantify the budget of flights and vocalizations.

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