

AVIAN FRUGIVORY ON HONEYSUCKLE (*LONICERA*) IN SOUTHWESTERN OHIO IN FALL¹

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ABSTRACT. Mist-netted birds were examined for evidence of frugivory on honeysuckle (*Lonicera Maackii* and *L. xylosteum*) by checking their feces for seeds. One-hundred-fifteen individuals of 26 species were examined. Nine of these species showed evidence of frugivory but only 21 of 82 individuals were frugivorous. Berries of *L. Maackii* were analyzed for food quality by determining carbon:nitrogen ratios and total percent lipid for whole berries. Results of these analyses showed the berries to be low in both protein and lipid and are therefore a poor energy source.

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INTRODUCTION

Few data are available on frugivory in temperate regions (Baird 1980, Rybczynski and Riker 1981, Robbins et al. 1975, Howe and Smallwood 1982). Here we report some systematically collected data on birds feeding on honeysuckle (*Lonicera*), a superabundant food resource, in order to ascertain its importance to avian populations in the fall.

METHODS AND MATERIALS

Our study area was the Peffer Park Nature Preserve on the Miami University campus, Oxford, Butler County, Ohio. Data were collected between 19 September and 15 November 1981. The area is an old field in the shrub stage of succession, densely populated with 2 non-native species of honeysuckle (*Lonicera Maackii* and *L. xylosteum*). These 2 species form a dense cover with the inter-bush spaces filled with briars (*Rubus* spp.) and roses (*Rosa* spp.). The honeysuckles are the dominant species and are present at a density of 700 bushes/ha determined by the use of ten .04-ha circles placed near mist-net lanes. These 2 species of honeysuckle in the Oxford area begin to flower in early May, berries begin to ripen in early June, and by early September all berries were ripe. Crop size ranged from 0 to 1.2 million berries per bush at the start of the study. Estimates of berry density were determined by counting the number of major stems per bush for 10 bushes and then counting the number of berries on a subsample of 10 major stems per bush. At the beginning of the study there were approxi-

mately 400 million berries per ha. Thus, honeysuckle represents a superabundant food resource in the community.

To determine the consumption of honeysuckle berries by birds, we checked the feces of mist-netted birds for the remains of berries. To capture the birds we ran 6–9 mist nets for 3.5 hr once a week during the study. Nets were placed so that at least one side was bounded by honeysuckle bushes. Netted birds were placed in separate compartments of a holding cage lined with newspaper and kept there for 10 min in cold weather and 15 min in warm weather; this time period is sufficient for birds to pass berries with a high water content (Welty 1975).

After a bird was released, feces were checked for the presence of *L. Maackii* and *L. xylosteum* seeds which were easily distinguished from the seeds of other fruits including those of *Lonicera japonica* which are purple. The seeds of *L. Maackii* and *L. xylosteum* could not be distinguished from one another. If an individual defecated in the hand while being removed from the net or while being banded, the feces were checked for seeds, and the bird was not detained. Although Rybczynski and Riker (1981) used the stains around the vent and mouth as an indication that birds were feeding on northern arrowwood (*Viburnum recognitum*), other fruits in our study area such as rose hips and the fruit of bitter-sweet (*Celastrus scandens*) would stain the same color as the honeysuckle. Therefore, birds that only showed stains were not counted. Also birds whose feces contained the remains of fruits but whose seeds could not be identified were not counted. The only high-quality fruit (Stiles 1980) available in the study area was grape (*Vitis* spp.), but it was rare. Other species present (all with low quality fruits (Stiles 1980)) were Japanese honeysuckle which was fairly common but had few fruits, buckthorn (*Rhamnus cathartica*), privet (*Ligustrum vulgare*), hawthorns (*Crataegus* spp.), and osage orange (*Maclura pomifera*). The 2 species of honeysuckle used in

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this study have low quality fruits as determined by this study.

RESULTS

One-hundred-fifteen individuals of 26 species of birds were examined for evidence of *Lonicera* frugivory (table 1). Nine species showed evidence of feeding on honeysuckle. Of 82 individuals of these species examined, 21 showed evidence of honeysuckle berries in their feces. In addition to the above species, a northern mockingbird (*Mimus polyglottus*) was observed eating berries on one occasion. Thirty-three individuals of 16 species showed no evidence of frugivory (table 1). As in the Rybczynski and Riker (1981) study, most of these non-frugivorous species were from 2 subfamilies, Parulinae (6 species) and Emberizinae (6 species). Twenty-eight other species were observed in the study area but were never captured and therefore not considered; of these, 15 species may be frugivorous such as yellow-rumped warbler (*Dendroica coronata*), brown thrasher (*Toxosoma rufum*) and blue jay (*Cyanocitta cristata*) (Thompson and Willson 1979). Due to the dense growth of briars and roses, it was not possible to collect systematic data on population sizes for the species of birds tested for frugivory; however, we believe the mist-net samples are a good indication of the relative numbers of birds present in the area.

Seventeen species were shared between this study and that of Rybczynski and Riker (1981). Four were frugivorous on both northern arrowwood and honeysuckle, 8 ate neither fruit, 2 fed only on arrowwood, and 3 fed only on honeysuckle.

DISCUSSION

Three species of warblers, Tennessee warbler (*Vermivora peregrina*), chestnut-sided warbler (*Dendroica pensylvanica*) and bay-breasted warbler (*D. castanea*), were recorded as non-frugivores both by Rybczynski and Riker (1981) and the present study. However, Greenberg (1981) has shown these same 3 species to be frugivorous once they reach Barro Colorado

TABLE 1
Frequency of *Lonicera* avian frugivores,
fall 1981, Oxford, Ohio.*

Species	Individuals showing evidence of <i>Lonicera</i> frugivory		
	N	frugivory	%
American Robin (<i>Turdus migratorius</i>)	21	7	33
Gray-cheeked Thrush (<i>Catharus minima</i>)	6	3	50
Swainson's Thrush (<i>Catharus ustulatus</i>)	3	1	33
Gray Catbird (<i>Dumetella carolinensis</i>)	4	1	25
Cedar Waxwing (<i>Bombycilla cedrorum</i>)	2	2	100
Northern Cardinal (<i>Cardinalis cardinalis</i>)	23	2	9
Purple Finch (<i>Carpodacus purpureus</i>)	2	2	100
American Goldfinch (<i>Carduelis tristis</i>)	12	2	17
White-throated Sparrow (<i>Zonotrichia albicollis</i>)	9	1	11

*The following 16 species were mist-netted on the study area but exhibited no evidence of *Lonicera* consumption (number caught follows scientific name): *Parus carolinensis*, 3; *P. bicolor*, 1; *Certhia familiaris*, 1; *Vireo griseus*, 1; *V. olivaceus*, 3; *Vermivora peregrina*, 3; *Dendroica magnolia*, 3; *D. castanea*, 3; *Seiurus aurocapillus*, 2; *Geothlypis trichas*, 2; *Icteria virens*, 1; *Passerina cyanea*, 4; *Spizella arborea*, 1; *S. pusilla*, 2; *Passerella iliaca*, 1; *Melospiza melodia*, 4.

Island, Panama. Morton (1973) found migrant warblers were frugivorous during seasons of tropical fruit abundance. Why these same species do not feed on the abundant honeysuckle and arrowwood crop during migration is not known but may be related to the quality of the fruit.

The low number of species and individuals that we recorded feeding on honeysuckle berries led us to question the quality of honeysuckle berries as an energy source. The berries of *L. Maackii* were analyzed in the fall of 1982 for 2 measures of food quality: carbon:nitrogen ratios for proteins (Russell-Hunter 1970) and percent total lipid (Bligh and Dyer 1959). Carbon:nitrogen ratios were determined for whole berries from 6 different bushes using

an elemental analyzer (Carlo ERBA Strumentazione, Model 1106). A C:N ratio of 17:1 or less constitutes a high-quality food based on protein (Russell-Hunter 1970). The C:N ratio for honeysuckle berries ranged from 29:1 to 56:1 ($\bar{X} = 41.1$, $SD = 9.17$), and total percent lipid for whole berries ranged from 4.53% to 5.02% ($\bar{X} = 4.78\%$, $SD = 0.20$, $N = 4$).

In order to compare the quality of honeysuckle berries to that of fruits studied by Stiles (1980) more fully, we also determined the number of seeds per berry and the number of seeds per kg of berries. The number of seeds per berry ranged from 3 to 11 ($\bar{X} = 6.57$, $SD = 1.93$, $N = 125$), and the number of seeds per kg of berries ranged from 15,900 to 32,700 ($\bar{X} = 23,895$, $SD = 47.83$, $N = 10$). The above values place the fruits of *L. Maackii* into Stiles' (1980) low quality fruit category by having low fat content and by being retained on the plant for long periods into the middle of winter. In addition, we tasted the berries, and, although they were not particularly sour, they did have an extremely bitter taste.

In view of the superabundance and conspicuousness of the honeysuckle in the study area, why so few individuals of the frugivorous species consume these berries is of interest. Even though the fruits are poor in nutrients, their high rate of passage through the digestive system and the small energy expenditure required for foraging, would lend one to expect the birds to feed

more on these berries. Additional data will be required to answer this question.

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