

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 by this study.

One-hundred-fifteen species of birds were examined for evidence of *Lonicera* frugivory. Of 82 individuals examined, 21 showed evidence of frugivory on the above species. *Mimus polyglottos* fed on one occasion. Individuals of 16 species were frugivorous (table 1) and Riker (1981) reported frugivorous species includes, Parulinae (6 species). Twelve species were observed in the study; never captured and banded; of these, 1 species frugivorous such as *Dendroica coronata*, *Parus rufum* and *Parus statura* (Thompson 1981). Due to the dense growth it was not possible to determine population size. Tested for frugivory: the mist-net samples of the relative number of the area.

Seventeen species were frugivorous in this study and the Riker (1981). Four species northern arrowwood ate neither fruit, 2 species and 3 fed only on

DISCUSSION

Three species of warbler (*Vermivora*) and bay-breasted warbler recorded as non-frugivorous (Rybczynski and Riker 1981). However, it is shown these same species frugivorous once they

an elemental analyzer (Carlo ERBA Stru- mentazione, 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 hon-

eyshuckle berries to that of fruits studied by

Stiles (1980) more fully, we also deter-

mined 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 addi-

tion, we tasted the berries, and, although

they were not particularly sour, they did

have an extremely bitter taste.

In view of the superabundance and con-

spicuousness 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 lead one to expect the birds to feed

more on these berries. Additional data will

be required to answer this question.

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LITERATURE CITED

- Baird, J. W. 1980 The selection and use of fruit by birds in an eastern forest. *Wilson Bull.* 92: 63-73.
- Bligh, E. G. and W. J. Dyer 1959 A rapid method of total lipid extraction and purification. *Canadian J. Biochem. Physiol.* 37: 911-917.
- Greenberg, R. 1981 Frugivory in some migrant tropical forest wood warblers. *Biotropica* 13: 215-223.
- Howe, H. F. and J. Smallwood 1982 Ecology of seed dispersal. *Ann. Rev. Ecol. Syst.* 13: 201-228.
- Morton, E. S. 1973 On the evolutionary advantages and disadvantages of fruit eating in tropical birds. *Amer. Nat.* 107: 8-22.
- Robbins, R. J., C. Casbon and G. E. Harris 1975 Observations of birds exploiting a central Michigan fruit tree. *Jack Pine Warbler* 53: 118-125.
- Russell-Hunter, W. D. 1970 Aquatic productivity. *MacMillan Co. NY.* 306 p.
- Rybczynski, R. and D. K. Riker 1981 A temperate species-rich assemblage of migrant frugivorous birds. *Auk* 98: 176-179.
- Stiles, E. W. 1980 Patterns of fruit presentation and seed dispersal in bird-disseminated woody plants in the eastern deciduous forest. *Amer. Nat.* 116: 670-688.
- Thompson, J. N. and M. F. Willison 1979 Evolution of temperate fruit/bird interactions: Phenological studies. *Evolution* 33: 973-982.
- Welty, J. C. 1975 The life of birds. W. B. Saunders Co. Philadelphia, PA. 623 p.

ABSTRACT. Experiments were not disturbed and pituitary gland densitometric correlation with similarly treated growth hormone

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A number of neonatal handling rational processes 1968, Daly 1975 have used overall index of growth handled animals weaning (Cines 1968) or later in 1961, Sobel et al. (1975). The age difference upon whether or fondled (Gen and Winick (1961) from the mother according to the Karas (1961).

In an early suggested that the growth observed result from the synthesis and pituitary gland separate the neural parameters we hypothesized

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