Avian Feeding on Seed of the Exotic Ornamental Lagerstroemia indica (Crapemyrtle)

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Avian Feeding on Seed of the Exotic Ornamental *Lagerstroemia indica* (Crapemyrtle)

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Abstract - The ornamental plant *Lagerstroemia indica* (Crapemyrtle) was introduced to American gardens before 1796, but little is known about its use as a food resource by avian species. Local wintering populations of *Spinus tristis* (American Goldfinch), *Junco hyemalis* (Dark-eyed Junco), and *Haemorhous mexicanus* (House Finch) feed heavily on Crapemyrtle seeds, and I observed 5 additional bird species occasionally extracting seeds from dehiscent capsules in Fairfax County, VA. Planted and naturalized Crapemyrtle may be an important food resource for finches and sparrows in southeastern US.

Introduction

Birds feed on the fruits and seeds of many introduced plant species (Martin et al. 1951) but surprisingly little has been published on avian use of introduced ornamental shrubs and trees in eastern North America, with the exception of the non-native invasive plants *Ligustrum* spp. (privets), *Lonicera* spp. (honeysuckles), and *Rosa* spp. (roses). *Lagerstroemia indica* (Crapemyrtle) was introduced to Charleston, SC, from eastern Asia between 1787 and 1796 by André Michaux (Cothran 2004, Favretti and DeWolf 1972). Their showy blossoms, attractive bark, cold and drought hardiness, and ability to grow in a wide range of soil types have made Crapemyrtle cultivars and hybrids (taxonomy follows ITIS: http://www.itis.gov) attractive to gardeners, and they are the most widely planted ornamental shrubs and small trees in public spaces, highway rights-of-way, and private gardens in the southeastern US (Apgar 1910, Ashe 1908, Chappell et al. 2012). More than 5 million Crapemyrtles were sold by nurseries in 2012 alone (USDA Census of Agriculture 2014). Most cultivars are cold hardy to USDA zone 7 (Daly et al. 2012), which extends north to Virginia, Tennessee, and northern Arkansas. Crapemyrtle has been widely planted and naturalized in the Gulf-coast states since the 19th century (Earle 1902, Harper 1931, Mohr 1901, Sanborn and Scholl 1908).

Avian feeding on Crapemyrtle seed in North America has been mentioned on a few gardening websites, but a search of scholarly databases revealed only a single peer-reviewed paper, which reported *Psittacara holochlorus* (P.L. Sclater) (Green Parakeet) feeding on the blossoms and seed in the lower Rio Grande Valley (Alexander 2016). Here I report the assemblage of avian species that feeds on Crapemyrtle seed in northern Virginia.

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Study-site Description

Crapemyrtle is commonly used as a landscaping-accent plant in residential neighborhoods surrounding the study site (~38º46'N, 77º5'W) in suburban Fairfax County, VA. I monitored birds feeding at a single multi-stemmed specimen (height = 6 m) that produced ~35,000–45,000 flowers annually. Pollinated flowers produce brown, ovoid capsules (8–10 mm in diameter) with 6 locules, each containing 4 winged seeds (Fig. 1) arranged in 2 longitudinal rows on either side of a secondary septum. Capsules begin to dehisce in late October, and most seeds are dispersed by wind by February. Extrapolated seed mass from a sample of air-dried seeds (n = 200) was ~570,000 per kilogram.

Methods

I monitored the focal specimen for a minimum of 30 min per day on a total of 280 days over 5 consecutive winters. Inclusive observation periods extended from 26 December 2013–26 February 2014 (48 observation days), 11 November 2014–28 February 2015 (95 observation days), 9 November 2015–29 February 2016 (97 observation days), 13 November–19 December 2016 (25 observation days), and 30 November–19 December 2017 (15 observation days). I made repeated scans of the Crapemyrtle specimen and counted birds observed extracting seeds. I did not count birds that perched but did not extract seed. I employed daily-high counts (by species) as proxies for the importance of Crapemyrtle seed in the winter diets of local populations. None of the birds were banded or color marked, so I was seldom able to monitor individuals for more than a few minutes.

To illustrate the seasonal pattern in *Spinus tristis* (American Goldfinch) feeding visitations, I pooled observations over 5 winters and conducted a distance-weighted least-square (DWLS) regression of daily-high counts, including days on which none were observed, on the elapsed time since 31 October. In this procedure,

Figure 1. Left panel: winged seed of *Lagerstroemia indica* (Crapemyrtle). Right panel: *Spinus tristis* (American Goldfinch) feeding on Crapemyrtle seed.

a polynomial regression was calculated for each value of X to determine the corresponding Y value such that the influence of individual data points on the regression decreases with distance from the particular X value. I performed analyses in SYSTAT Version 12 (SYSTAT 2007).

Results

American Goldfinch is a frequent seed predator of Crapemyrtle and was present on 40% of the observation days and comprised 49% of all birds recorded extracting seed (Table 1). Singletons or small flocks often spent several hours partially concealed in dense clusters of seed capsules extracting and consuming seeds. Although I did not measure handling times or husking proficiency (Zweers et al. 1994), the bill morphology, body size, and foraging agility of goldfinches appear to be fortuitously scaled for extraction of seeds from the dehisced Crapemyrtle capsules (Fig. 1). Goldfinch feeding activity increased steeply in early December, peaked in mid-December, and gradually declined through late February (Fig. 2).

Table 1. Avian species feeding on Crapemyrtle seed during 280 observation days over 5 consecutive winters (2013–2017) in Fairfax County, VA.

Common name	Scientific name	Number of days observed feeding	Total number of individuals observed
American Goldfinch	*Spinus tristis* (L.)	111	355
Dark-eyed Junco	*Junco hyemalis* (L.)	60	145
House Finch	*Haemorhous mexicanus* (P.L. Statius Müller)	51	144
Northern Cardinal	*Cardinalis cardinalis* (L.)	30	43
House Sparrow	*Passer domesticus* (L.)	14	24
White-throated Sparrow	*Zonotrichia albicollis* (J.F. Gmelin)	3	9
Song Sparrow	*Melospiza melodia* (A. Wilson)	1	1
Pine Siskin	*Spinus pinus* (A. Wilson)	1	1

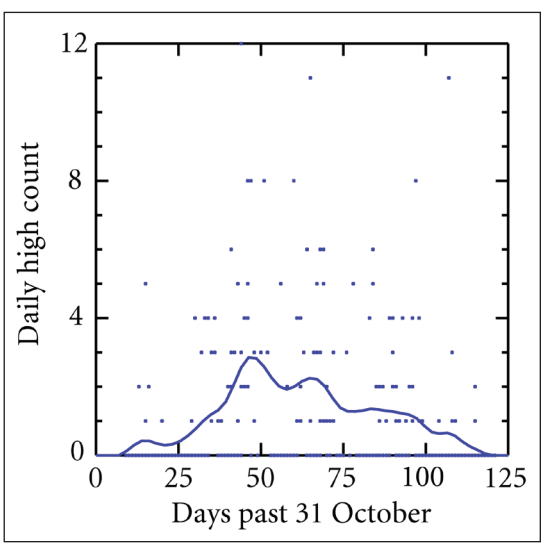

Figure 2. Daily-high counts of *Spinus tristis* (American Goldfinch) observed extracting seed from capsules of *Lagerstroemia indica* (Crapemyrtle) in Fairfax County, VA. Curved line represents the distance-weighted least-square regression of daily-high counts (including zero values) recorded during 5 consecutive winters (2013–2017).

I also frequently observed *Junco hyemalis* (Dark-eyed Junco; 21% of observation days), *Haemorhous mexicanus* (House Finch; 18%), and *Cardinalis cardinalis* (Northern Cardinal;11%) feeding on Crapemyrtle seed. *Passer domesticus* (House Sparrow) and *Zonotrichia albicollis* (Gmelin) (White-throated Sparrow) frequently perched in the focal tree but I seldom observed them extracting seed from capsules (only 3% and 1% of observation days, respectively). Feeding activity of all species was less frequent during significant precipitation events and the day after, perhaps owing to the increased difficulty of extracting seed from sodden capsules. Seed retained in capsules decreased rapidly in January and relatively little remained by late February. Fallen seed was gleaned regularly from the ground by Northern Cardinals, Dark-eyed Juncos, and sparrows but not American Goldfinches. Crapemyrtle seed contains alkaloids, phenols, flavonoids, and cardiac glycosides (Ajaib et al. 2016, Ferris et al. 1971). The extent to which secondary compounds have an inhibitory effect on avian seed predators is unknown.

Discussion and Conclusions

The horticultural and naturalized Crapemyrtle populations in eastern North America represent an anthropogenic experiment set in motion by the plant's introduction in the late 18th century. Native birds in this region have had more than a century to discover this novel food resource and learn to extract the winged seeds from the hexamerous seed capsules. I observed 8 granivorous bird species extract seed from Crapemyrtle capsules in this study. Fieldwork in other parts of the introduced geographic range of Crapemyrtle will likely add additional species to the roster. In any event, I hypothesize that the millions of Crapemyrtles present on the coastal plain, from Virginia to Texas, are an important winter food resource for Cardueline finches and sparrows. This introduced ornamental plant also provides abundant nesting and roosting sites for birds in suburban areas (Small et al. 2005, Telfair 2010), although there have been no comprehensive field studies focused on avian use of Crapemyrtle plantings. The leaves, bark, and fruit of Crapemyrtle contain a number of phytochemicals that make them unpalatable to herbivorous insects (Ajaib et al. 2016, Chappell et al. 2012, Ferris et al. 1971). As a result, this plant species hosts relatively few arthropods for avian insectivores.

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