
Trees and Shrubs for Wildlife: The Good, The Bad, and The Ugly
Marne Titchenell
Extension Program Specialist – Wildlife
School of Environment & Natural Resources
Amy Stone
Extension Educator – Lucas County
Department of Extension
CFAES
The Ohio State University
College of Food, Agricultural, and Environmental Sciences

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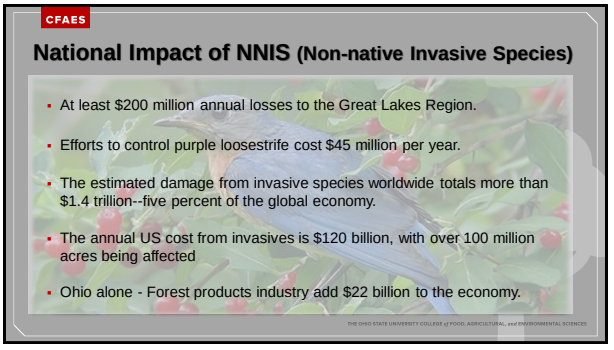
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National Impact of NNIS (Non-native Invasive Species)
At least $200 million annual losses to the Great Lakes Region.
Efforts to control purple loosestrife cost $45 million per year.
The estimated damage from invasive species worldwide totals more than $1.4 trillion--five percent of the global economy.
The annual US cost from invasives is $120 billion, with over 100 million acres being affected
Ohio alone - Forest products industry add $22 billion to the economy.

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The Threat of NNIS on Wildlife
Loss and degradation of habitat continues to be the primary threat to Ohio's wildlife

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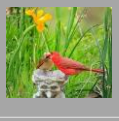
NNIS Cause Loss of Habitat

- Reduced native food and cover resources
  - In quantity and diversity
  - Impacts up through the food webs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Non-native Invasive Species as Ecological Traps

- Poor nutrition
- Poor nesting habitat

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Non-native Invasive Species as Ecological Traps

- Wood thrush and robin higher nest predation in honeysuckle and buckthorn (Schmidt and Whelan 1999)
- Cardinals nesting in honeysuckle fledged 20% fewer young (Rodewald, 2010)
- Early leaf-out appealing for nesting



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Impacts on Reproductive Strategies?

Carotenoids pigments

↓

Urban birds eat honeysuckle berries

↓

Brightly feathered birds not as healthy

↓

Bright feathers ≠ quality mate

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Cedar Waxwing Tail Tips

Cedar Waxwings with orange instead of yellow tail tips began appearing in the northeastern U.S. and southeastern Canada in the 1960s.

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Disrupting Food Webs

- Lepidoptera
  - Butterflies, skippers, and moths
- Pollinator diversity decreased in honeysuckle invaded areas
  - Spring caterpillar and summer butterfly diversity down (Doyle, thesis, 2006)
- Removing privet increased diversity and abundance of butterflies and native bees (Hanula and Horn, 2011)

E. Tiger Swallowtail

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White-tailed Deer and NNIS

White-tailed Deer

Browser – 7-10 lbs vegetation/day

Overabundant populations can cause damage to forest understory.

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White-tailed Deer Herbivory Impacts

Over-browsing by high deer populations → less palatable species left & disturbance to understory and forest floor → invasives invade (Knight et al. 2009)

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Cade's Cover in Great Smokey Mountains NP

Outside the fence, deer consumed seedlings and saplings and reinforced the dominance of Japanese stiltgrass.

Inside the fence, multiflora rose increased.

Picture courtesy Brian MacGowan

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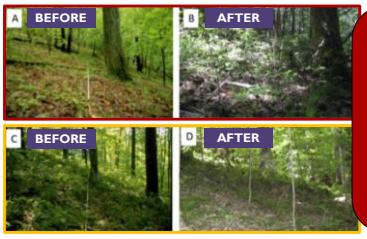
White-tailed Deer Herbivory in Indiana State Parks



After 17 years of controlled deer hunts:

1) plant species richness, diversity, and herbaceous layers increased

2) exotic species cover decreased

(Jenkins et al. 2014).

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White-tailed Deer Herbivory in Indiana State Parks

Moderate levels of deer browsing promote herbaceous layer diversity when combined with other disturbances. (Royo et al. 2010)

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Invasive Species x Deer Interactions ≠ Simple

Earthworms x Invasive Plants x Deer Herbivory Impacts
(Davalos et al. 2015)

High deer herbivory + earthworms = higher success of invasive plants growth and colonization

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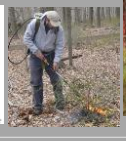
Non-native, Invasive Species and Ticks

- Japanese barberry creates favorable microhabitat beneficial to black-legged tick survival
  - Managing barberry → decrease in ticks *(Williams et al., 2017)*



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Alternative to Non-native, Invasive Plants

Asian Bush Honeysuckles: Amur, Morrow, and Tatarian (Lonicera maackii, Lonicera morrowii, and Lonicera tatarica)
- Form dense populations in the understory of woods
- Leaf out early and hold leaves late in the fall
- Seeds from red berries are dispersed by birds and deer

Recommended Alternatives:
- bottlebrush buckeye (Aesculus parviflora)*-US
- black chokeberry (Aronia melanocarpa)-OH
- summersweet clethra (Clethra alnifolia & CVs)-US
- common winterberry (Ilex verticillata & CVs)*-OH

- Ohio Invasive Plant Council's **Alternatives for Invasive Plants** Brochure:
- **www.oipc.info/plants-to-replace.html**

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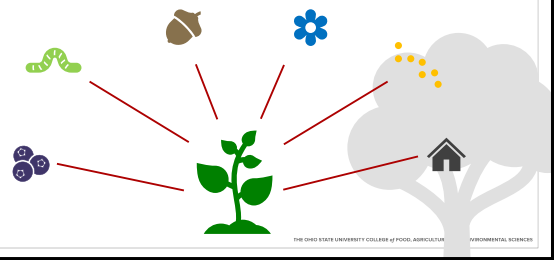
Plants provide the food many wildlife species need.



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Quercus – The Oaks

557 F Sp

Select species – White Oak Group:

- **White oak**, swamp white oak, bur

Select species – Red Oak Group:

- N. red oak, **pin oak**, scarlet oak

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Quercus – The Oaks

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White Oak Group Acorns

- Less tannins and fat
- Mature after 1 growing season
- Germinate in the fall
- **Readily eaten in fall**

Red Oak Group Acorns

- More tannins and fat
- Mature after 2 growing season
- Germinate in the spring
- **VIP winter food source**




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Quercus – The Oaks

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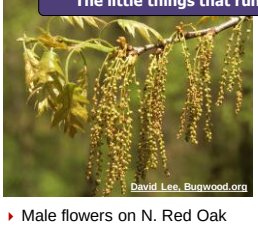
"The little things that run the world." – E.O. Wilson



75% of the birds that breed in Ohio depend on caterpillars.

- Male flowers on N. Red Oak

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Top Plant Genera that Support Lepidoptera

Herbaceous Plants:

- Goldenrods
- Asters
- Sunflowers
- Wild strawberries
- Smartweeds
- Plantain

Tallamy and Shropshire 2008, Conservation Biology , Aug., 2009, Vol. 23, No. 4

Table 1. Twenty most valuable plant genera ranked (from most to least) in terms of their ability to support Lepidoptera species in the mid-Atlantic (U.S.A.) region.

Rank	Plant genus	Common name	Lepidoptera richness
1	*Quercus*	oak	534
2	*Prunus*	cherry; plum	456
3	*Salix*	willow	455
4	*Betula*	birch	411
5	*Populus*	poplar; cottonwood	367
6	*Malus*	crabapple	308
7	*Vaccinium*	blueberry; cranberry	294
8	*Acer*	maple	297
9	*Alnus*	alder	255
10	*Carya*	hickory	235
11	*Ulmus*	elm	215
12	*Pinus*	pine	201
13	*Crataegus*	hawthorn	168
14	*Rubus*	blackberry; raspberry	163
15	*Picea*	spruce	150
16	*Fraxinus*	ash	149
17	*Tilia*	basswood	149
18	*Pyrus*	pear	138
19	*Rosa*	rose	135
20	*Corylus*	filbert	131

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Quercus – The Oaks

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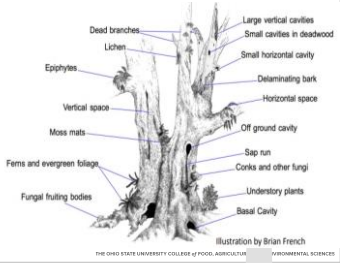

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Other Hard Mast Producers

Trees

- Hickory
- **Beech**
- Hazelnut
- Maple
- **Birch**
- Pine
- Walnut
- Ostrya virginiana
- Carpinus caroliniana

Herbaceous

- Coneflowers
- Asters
- Sunflowers
- Thistles
- Goldenrod
- Bergamot
- Ironweed
- Golden alexanders

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297 F Sp

Acer – The Maples

Select species:

- Sugar, red, **silver**, boxelder
- Important ***early*** nectar and pollen source
- Back-up seed source
- Good nesting cover
- Cavities form with age
- Sap flow

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Su, F 456 Sp Sp

Prunus – Cherry and Plum

Select species:

- **Black cherry, chokecherry, American plum**
- *Prunus* shrubs offer good cover
- Cherries ideal fruit
- Top lepidopteran host plant

Rob Routledge, Sault College, Bugwood.org

Luke Armstrong

James R. Holland, Bugwood.org

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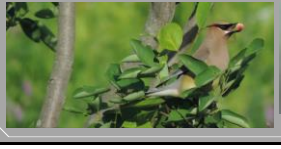
Su 124 Sp Sp

Amelanchier – Serviceberries

Select species:

- **Downy and Allegheny**
- Small tree/multi-stemmed
- Aka Juneberry
- Good landscape tree



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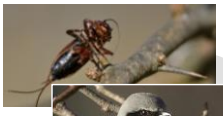
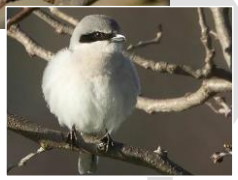
Crataegus - Hawthorn

Su/W 168 Sp Sp

- Small, dense trees
- Grow best in full sun
- Great nesting cover





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Crataegus - Hawthorn

Su/W 168 Sp Sp

- Small, dense trees
- Grow best in full sun
- Great nesting cover
- Winter food source
- Extrafloral nectaries

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Plants for Insect Predators

Annuals

- **Dill *(Anethum graveolens)***
- Coriander *(Coriandrym sativum)*
- Sweet alyssum *(Lobularia maritima)*

Perennials

- Asters *(Aster)*
- **Lobelia *(Lobelia)***
- Lupine *(Lupinus)*
- Bergamot *(Monarda)*
- Giant Hyssop *(Agastache)*
- Ironweed *(Vernonia)*
- Goldenrod *(Solidago)*

Extrafloral nectar

- Milkweed *(Asclepias)*
- Sunflower *(Helianthus)*
- Hibiscus *(Hibiscus)*
- Pumpkin/Squash *(Cucurbita)*
- Jewelweed *(Impatiens carpensis)*

- Apple *(Malus)*
- Plum, cherry *(Prunus)*
- Hawthorn *(Crataegus)*
- Willow *(Salix)*
- **Elderberry *(Sambucus)***
- Viburnum *(Viburnum)*

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More Info on Insect Predators

by Mary Gardiner

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More Trees that Produce Berries

- Red Mulberry *(Morus rubra)*
- Crabapple (*Malus*)
- Eastern Red Cedar (*Juniper virginiana*)
- Sumac (*Rhus*)
- Persimmon (*Diospyros*)
- **Pawpaw *(Asimina triloba)***
- Sassafras *(Sassafras albidum)*
- **Blackgum *(Nyssa sylvatica)***
- Hackberry *(Celtis occidentalis)*

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Sp Sp 19 F

Cercis canadensis – Eastern Redbud

- Early pollen and nectar source
- Aesthetical value
- Protein-rich seeds

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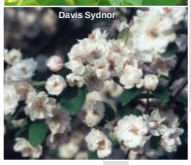
Nectar, Pollen, and Host Plants

- Serviceberry
- Maple
- Cherry, Plum
- Witch-hazel
- Sumac
- Viburnum
- **Tuliptree (yellow poplar)**
- Oak
- Willow
- Birch
- **Crabapple**
- Red buckeye
- Dogwood
- Sassafras
- Red buckeye
- Cottonwood
- Hickory
- Elm
- Ash



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Cornus – The Dogwoods

Su, F 118 Sp Sp

Select Species:

- Trees: **Flowering** & Pagoda *(C. alternifolia)*
- Shrubs:
  - ***C. sericea* (red-osier)** & *C. racemosa* (gray) have small, white berries, good cover
  - *C. amomum* (silky) – larger, blue berries

Chris Evans, University of Illinois, Bugwood.org

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Viburnum

Su 104 Sp Sp

Select species:

- Mapleleaf *(V. acerfolium)*
  - Shade-loving, good cover
- **Arrowood *(V. dentatum)***
  - Small berries, good cover
- **Blackhaw *(V. prunifolium)***
  - Large shrub, good berries
- Nannyberry *(V. lentago)*
  - Larger fruits, least preferred?

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F 19 Su Su

Cephalanthus occidentalis - Buttonbush

- Good source of nectar and pollen (bumblebees)
- Found in wetlands, full sun

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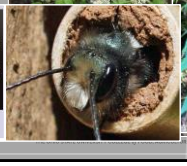
Su, F 42 Su Su

Sambucus - Elderberries

- Common/Black *(S. canadensis)*
  - Dark berries, white pith – late summer
- Red *(S. racemosa)*
  - Red berries, orange pith – early summer



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163 Su Su Su

Rubus – Raspberries/Blackberries…

Select Species: **Blackberry**, red raspberry**, black raspberry**, dewberry

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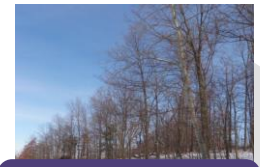
Habitat for Quail, Turkey, Pheasant, and more…

- Field borders, edges, wind breaks…
  - Great for bobwhite quail
    - Briars (blackberry, raspberry)
    - Dogwood (red-osier, silky, gray)
    - Hazelnut, elderberry, pussy willow
    - Green briar, poison ivy, wild grape



Diverse, native hedgerows can also attract beneficial insects (syrphid flies, parasitic wasps, lady beetles) and insectivorous birds for controlling pests in fields.

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F 39 Su Su

Ilex – The Hollies

- Winterberry (*I. verticillata*) heavily used by bees
- Good cover for shrub nesting birds
- Fruit eaten in winter

Female flowers

Sam O'Connell

Winter Berry Persistence:

Chokeberry (*Aronia*)
Blackhaw (*V. prunifolium*)
Hawthorn (*Crataegus*)
Hollies (*Illex*)
Sumac (*Rhus*)
Hackberry (*Celtis*)

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Pollen Specialist Bees and their Plants

…bees in eastern U.S. are pollen specialists

Willow miner bee

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Pollen Specialist Bees and their Plants

- ~25% or 700+ native bees in eastern U.S. are pollen specialists
- Plants that support pollen specialists:
  - *Salix* (willow)
  - *Cornus* (dogwood)
  - *Viburnum*
  - *Ilex* (holly)
  - *Vaccinium* (blueberry/cranberry)
  - *Cercis* (redbud)
  - Asteracea (aster family)

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A few others…

- **Sumac (*Rhus*)** – staghorn, winged, smooth, **fragrant**
- Spicebush (*Lindera benzoin*)
- **Chokeberry (*Aronia*)** – **red**, black
- *Diervilla lonicera* **–** native bush honeysuckle
- Woodland vines – wild grape, v. creeper, poison ivy
- Virginia sweetspire (*Itea virginica*)
- Sweetpepperbush (*Clethra alnifolia*)
- **Bottlebrush buckeye (*Aesculus parviflora*)**

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Alternatives to Invasive Species:

- Ohio Invasive Plant Council's **Alternatives for Invasive Plants** Brochure
  - **www.oipc.info/plants-to-replace.html**

Common Buckthorn (*Rhamnus cathartica*) SHRUB

- Deciduous shrub or small tree with heavy fruit production
- Produces many seedlings and has vigorous sprouting
- Prefers more upland habitats than glossy buckthorn

Recommended Alternatives:

black chokeberry (*Aronia melanocarpa*)*-OH
gray dogwood (*Cornus racemosa*)*-OH
(native) bush-honeysuckles (*Diervilla* spp.)-US
common witch-hazel (*Hamamelis virginiana*)-OH

More on witch-hazels from Secrest Arboretum's Paul Snyder:
bygl.osu.edu/node/1751

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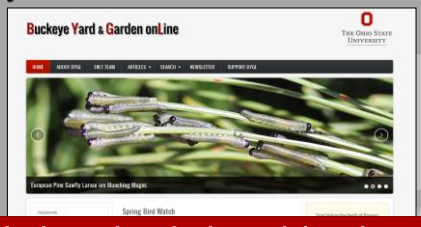
Buckeye Yard & Garden onLine



bygl.osu.edu or bygl.osu.edu/newsletter

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Upcoming Webinars Related to this Topic:

- March 12th - Day in the Woods Program – Trees and Shrubs for Wildlife
  - Register - u.osu.edu/seohiowoods
- Ohio Women in Science Series – Thursdays in March
  - March 4 – Jennifer Windus – Invasive Plants and Habitat Restoration

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Recommended Resources/Books:

- **Shrubs and Woody Vines of Indiana and the Midwest** by Sally and Harmon Weeks
- **Native Trees of the Midwest** by Weeks, Weeks, and Parker
- Ohio Trees for Bees – OSU Extension fact sheet
- Enhancing Food (Mast) Production for Woodland Wildlife – OSU Extension fact sheet
- Xerces Society – **xerces.org**
- Lady Bird Johnson Wildflower Center **– wildflower.org**
- More info on specialist bees:
  - **jarrodfowler.com/host_plants.html**
  - **jarrodfowler.com/specialist_bees.html**

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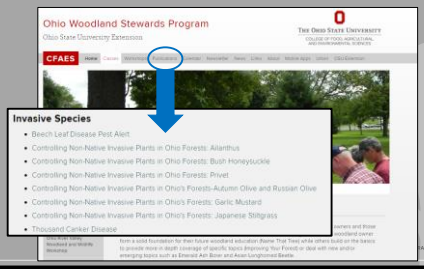
woodlandstewards.osu.edu



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Questions?

Marne Titchenell,
Extension Wildlife
Specialist
titchenell.4@osu.edu

Amy Stone
Extension Educator
Stone.91@osu.edu

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