

Scattering Scats: White-Tailed Deer as Seed Dispersers

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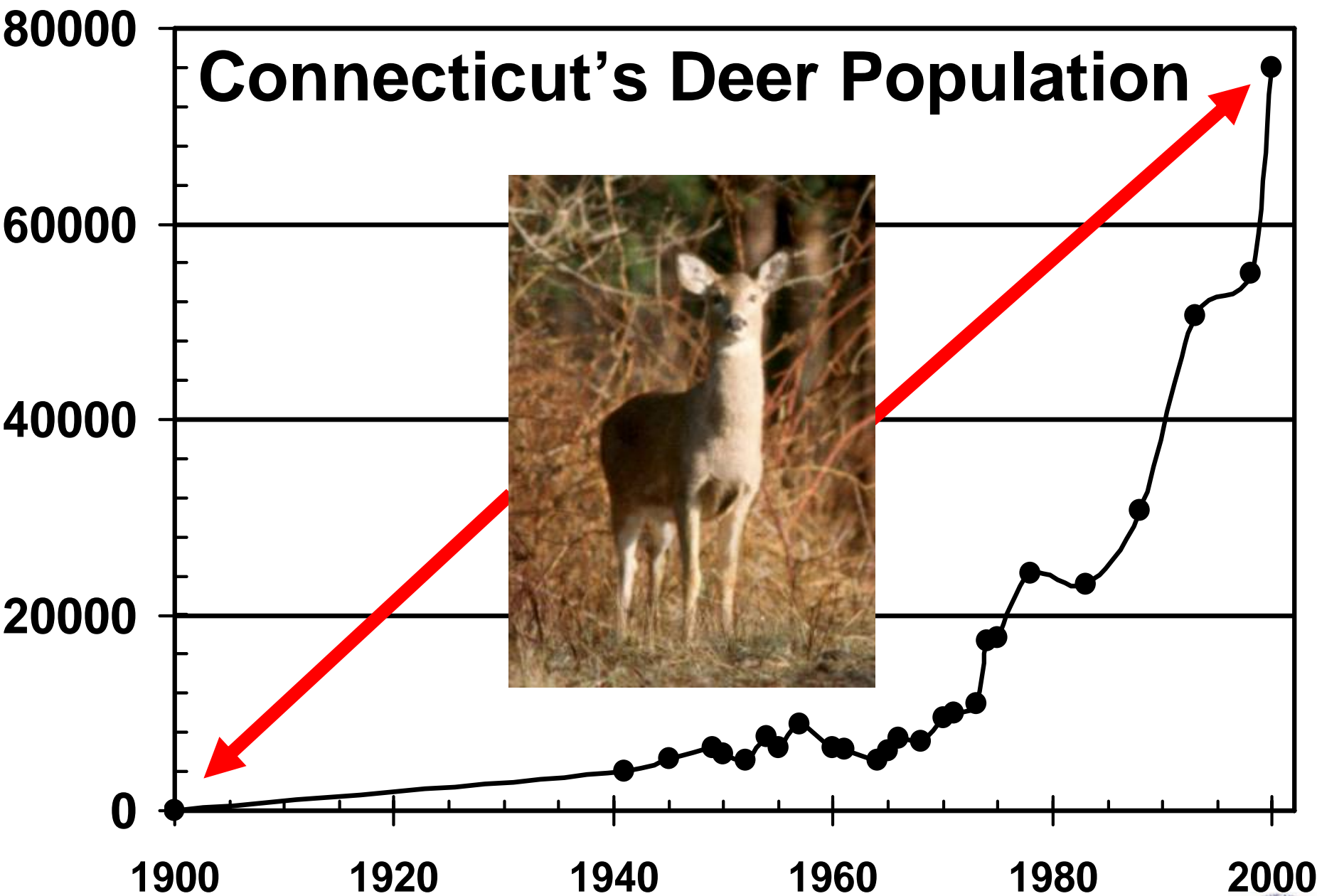
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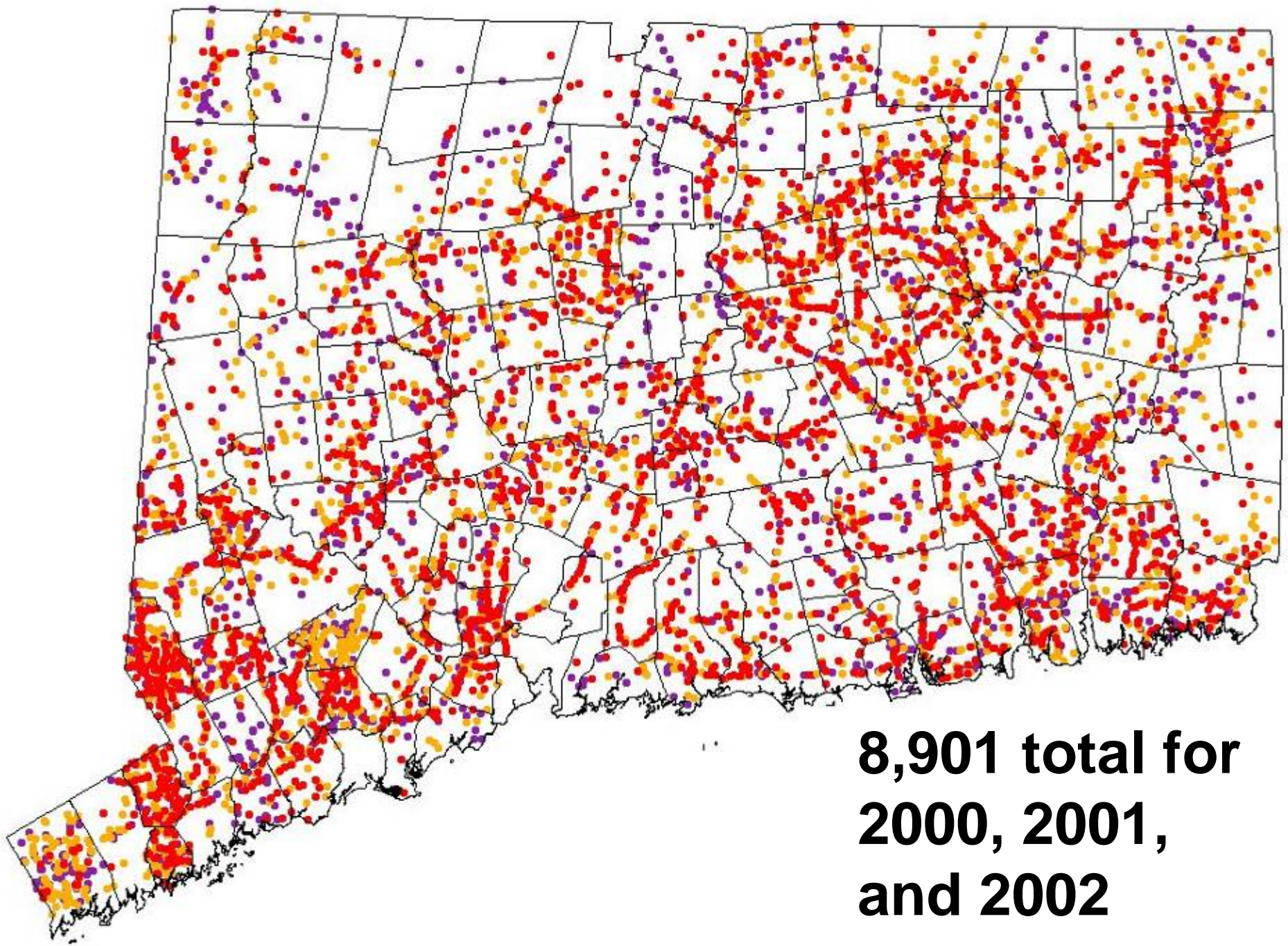
Connecticut's Deer Population



Deer Research at CAES

- **Deer Vehicle Collisions**
 - **Pinpointing DVC statewide 2000-present**
 - **Working with DOT on avoidance strategies**





**8,901 total for
2000, 2001,
and 2002**

Deer Research at CAES

- **Deer Impacts on Native Flora**
 - **4 exclosures at each of 4 locations**
 - **Vegetation sampled in and outside**
 - **Working with The Nature Conservancy and SCCRWA.**



Deer Research at CAES

- **Deer Repellent Trial**
 - **Testing 10 different commercial repellents**
 - **Come see us for information and pubs.**



Dispersing Seeds

- Different strategies for seed dispersal

- Anemochory
- Hydrochory
- Epizoochory



- Endozoochory
 - Birds.



Shifting Objectives

- **Initially, to determine if deer were significant seed dispersers**
- **Then, to determine which plant species**
- **Then, to document dispersal of CT exotic plants by deer**
- **And to determine similar characteristics of plants.**





**SCCRWA's
Lake Gaillard**

59 deer/mile²



Methods

- **566 samples gathered 2002-2005**
- **Vernalized at 40°F for 60 days**
- **Planted in potting soil in greenhouse**
- **4 samples / tray**
- **1 control tray / 8 treatment trays.**



Methods

- **2002 + 2003 samples planted intact**
- **2004 + 2005 samples crumbled, then planted.**





45

50

54

58

49

53

48

52

51









115





Results

Deer Spread Alien Invasive Species



Deer Spread Alien Invasive Species

- 11,512 individual germinants
- 87 unique taxa (74 to species, 13 to genus)
- 51 species (64%) not native to CT
- 79% of seedlings (n=8,863).

Plant



Deer Spread Alien Invasive Species

- 4 categories:

Plant

- Fruits
- Small seeds close to foliage
- Raised seed heads
- Grasses.



Fruits

- **Most large relative to foliage**
- **Accidental ingestion by deer not likely with multiple germinants**
- **Likely targeted by deer directly**
- **29% of germinated species.**



American Pokeweed (*Phytolacca americana*)

n = 868 Native

POISONOUS!



Carolina Horsenettle (*Solanum carolinense*)

n = 647

Exotic
POISONOUS!



Wineberry (*Rubus phoenicolasius*)

n = 467 **Exotic**

DELICIOUS!



Black Nightshade (*Solanum nigrum*)

n = 47

Exotic

POISONOUS!





Multiflora Rose (*Rosa multiflora*)

n = 33

Exotic





Apple
(*Malus* sp.)

n = 2

Exotic





Corn
(*Zea mays*)

n = 1 **Exotic**





**Green
Pepper
(*Capsicum*
sp.)**

n = 1

Exotic



Seeds close to foliage (Foliage is the Fruit)

Janzen 1984

40% of germinated species

Janzen, D. H. 1984. Dispersal of small seeds by big herbivores: foliage is the fruit. *The American Naturalist* 123:338-353.



Purslane (*Portulaca oleracea*)

n = 7,209

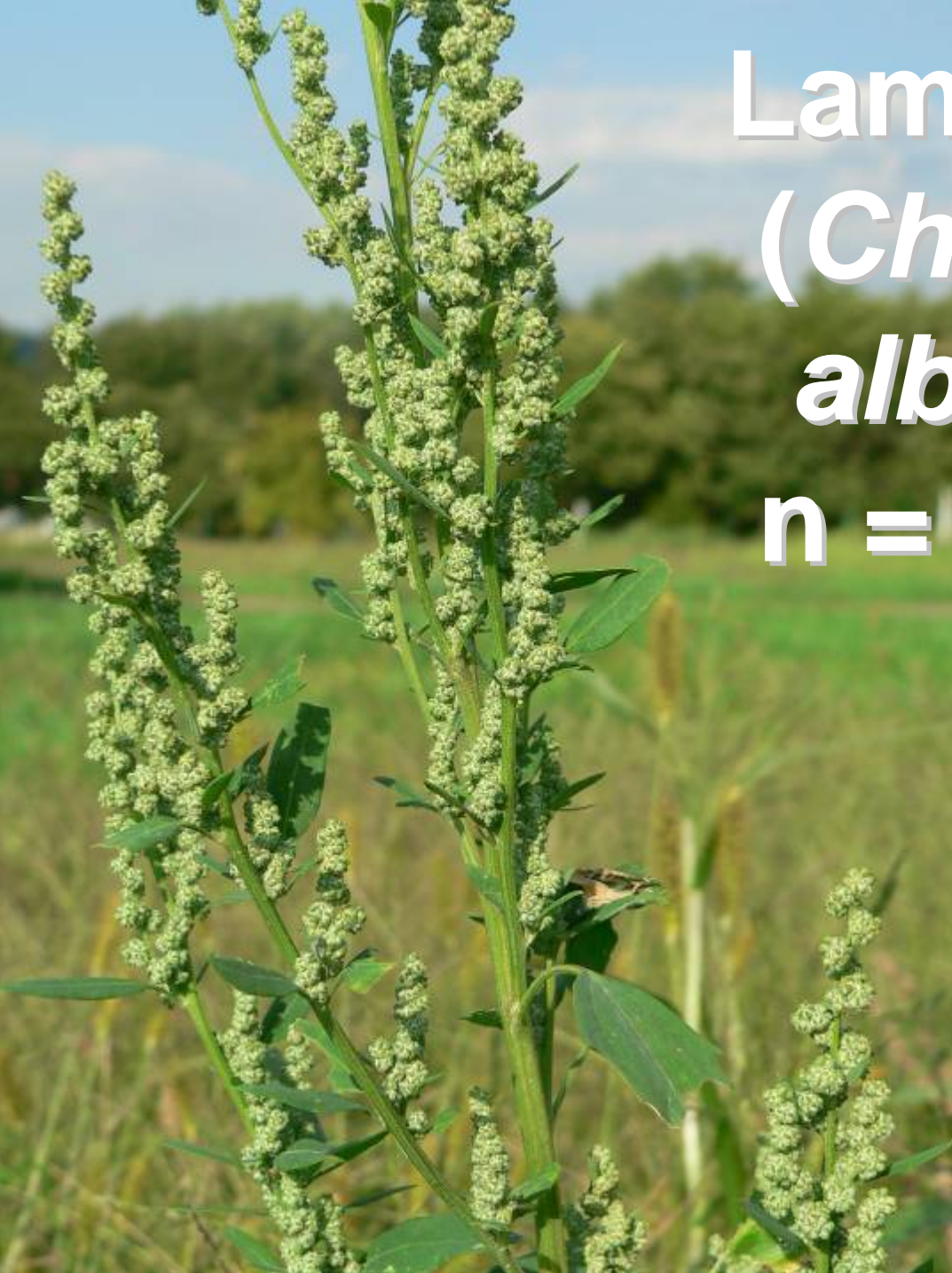
Exotic



Canadian Clearweed (*Pilea pumila*)

n = 621 Native





Lamb's Quarters (*Chenopodium album*)

n = 199

Exotic





**Redroot
Amaranth
(*Amaranthus
retroflexus*)**

n = 20

Exotic



Raised Seed Heads

10% of germinated species





**Pennsylvania
Smartweed
(*Polygonum
pensylvanicum*)
n = 69
Native**



Common Plantain (*Plantago major*)

n = 24

Exotic





**Common
Gypsyweed
(*Veronica
officinalis*)**

n = 9

Exotic



Bird's-foot Trefoil (*Lotus corniculatus*)

n = 54

Exotic



Grasses

21% of germinated species



Crabgrass

(*Digitaria sanguinalis*)

n = 17 **Exotic**





Wavy Hair Grass (*Deschampsia flexuosa*)

n = 8

Native



**Nepalese
Browntop
(Japanese
Stiltgrass)
(*Microstegium
vimineum*)**

n = 7

Exotic



Germinated Species

- **Strategic seed placement**
- **Prolific**
 - **Lots of seeds**
- **Vigor**
 - **Survive mastication/rumen passage**
 - **Germinate from pellets**
- **Many exotics fit this description.**



Seed Dispersal Numbers

- 6 mile² research site
- 59 deer/mile²
- $6 * 59 = 354$ deer on site
- Defecation rate = 25/day
- $354 \text{ deer} * 25 = 8,850!/\text{day}$

- Mean of 20.3 germinable seeds per



179,655

**Germinable
seeds/day**

Or . . .



**508 germinable
seeds/deer/day**

Of which. . .

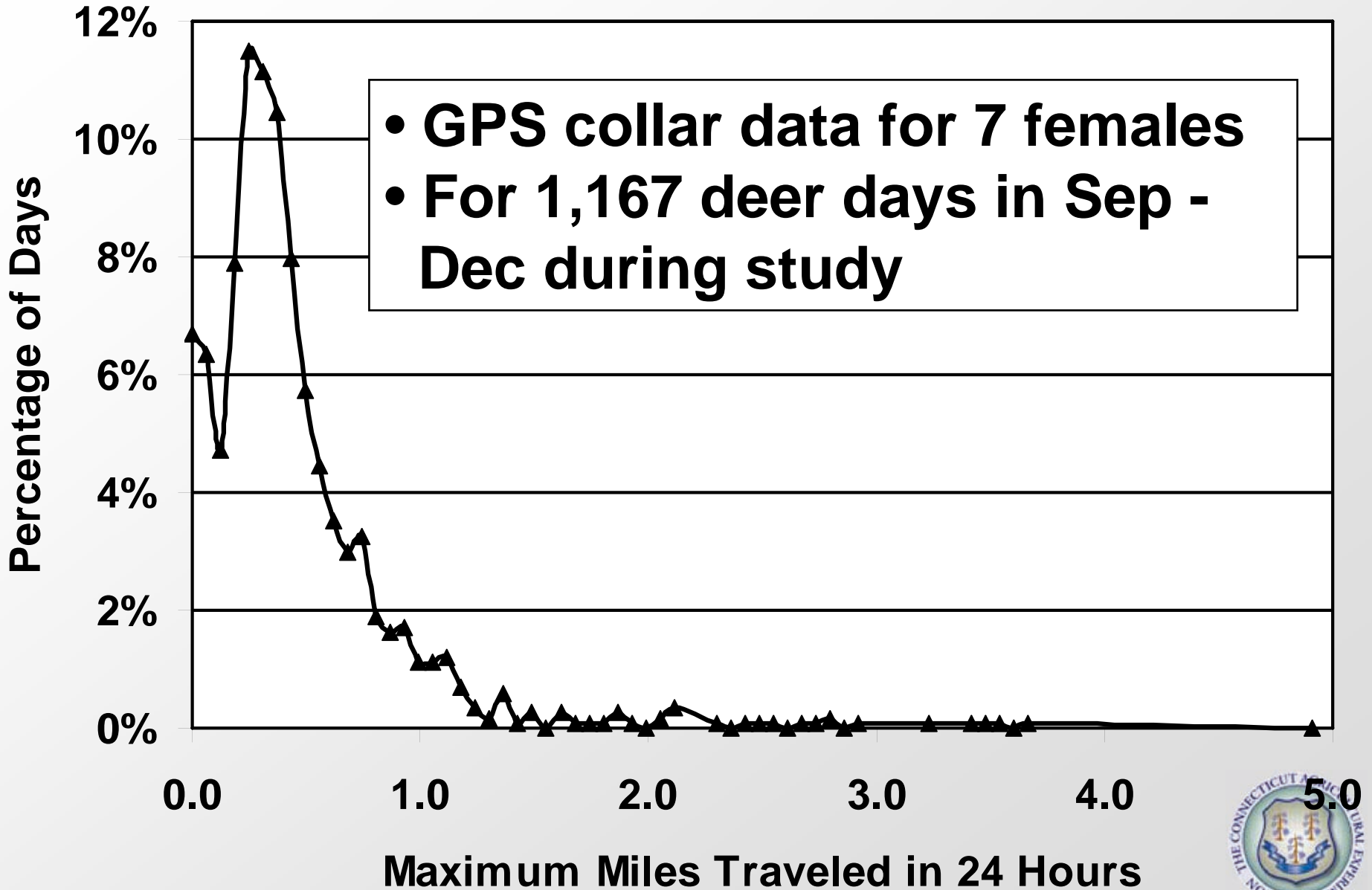


79% are exotic to CT

**Approx. 400
germinable exotic
seeds/deer/day**



Deer Movement



In Conclusion . . .

Deer as Seed Dispersers

- Transport majority exotic seeds
- Likely feeding in “edge” habitats with abundance of exotics
- Transporting seeds into woodland interior
 - Females on site traveled up to 5 miles/day
- Exotic seeds contributed to seed bank
 - Most will germinate when suitable conditions arise (i.e. disturbance events, natural or human caused)



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Questions/Contact Info

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