Tuesday Lecture

2024-09-10

**Cues for Habitat Selection**

Quiz:

What is the name for the type of behavior whereby the object of an otherwise instinctive action is acquired? *Imprinting*

* Instinctive action that is going to happen regardless of circumstances, it just happens this way because of the specific circumstances. Lasting consequences or effects for the lifetime of the individual.

In the Wecker experiment, what habitat type did the offspring of field-caught parents raised in forest select? *Field*

* The wild-caught field subspecies raised their young in the forest, young had never seen a field before. Wecker hypothesized that a heritable aspect was carried over from the wild-caught parents.
* Cross-fostering would help tease out if it was something learned.

Continuing **Wecker et al.** discussion, lab raised mice were bred for 12-20 generations in the lab.

* What did Wecker hypothesize why the lab raised mice did something completely different from the field-raised mice?
  + Some loss of the genotype for field habitat type preference.
* By what processes could you lose those genes that help you succeed in a prairie environment?

1. **Genetic drift**: random loss of genetic information. Could have happened by chance that the mice collected from the field and bred in lab conditions drifted away from the preference for field habitat type.
2. **Selection**: Certain genotypes do better in a certain environment. The mice that did better in lab conditions could have been the ones that were most successful in passing on their genes, compared to those that thrived in the field, but not in the lab.

**Settling response**: here are the resources, conditions, and risks (sign stimuli) that allow me to persist causing an individual to choose that area to inhabit.

**Direct cues**: resources – the organism can directly observe predators, current temp/humidity conditions, or current availability of food/water

**Hammerstrom *et al.*, Kestrels**

* Kestrels were already passing through this area and immediately started using nest boxes and fledging young after they were introduced.
  + What does this tell us about the sign stimuli that kestrels need to elicit this nesting response
    - Very strong response to a dark cavity.
* Other things that might cause so many of these nest boxes to not be used?
  + Presence/proximity of other kestrels or other species.
  + Interspecific competition: Starlings could have kicked out the kestrels, everything else in the area could have looked good, but it’s no longer habitat for the kestrel due to presence of Starlings in the nest box.

**Indirect cues**: cannot evaluate the resource itself; must rely on a surrogate to indicate how the target resource will be present sometime in the future that will benefit them.

* Example: migratory songbirds coming back to breeding grounds during the spring. Good habitat could include lots of food resources. Birds may return to breeding habitat before the bugs are plentiful, so there must be some indirect cues that the individual is seeing and knows it will correspond with the resources.
* Some cue that indicates there will be the presence of a necessary resource/condition that makes this a suitable habitat despite the resource/condition not currently present.

Steidl paper, woody encroachment on semiarid grasslands, association of grassland birds to woody encroachment environments, patterns of responses in different species.

* Eastern meadow larks, very distinct threshold for woody plant cover. Once you get enough woody cover, meadow larks stop nesting there.
* These species are keying in on woody plant cover as some sort of cue. Uncertain whether they represent direct or indirect cue (presence/absence of wood cover keys in on another resource aspect).

Prey can use cues to evaluate the risks of predation and the tradeoffs between foraging and predation risk.

* Largemouth bass (predator), bluegill (prey). Cleared vegetation out of ponds, net in the middle with bluegill on one side, bass and bluegill on the other.
  + Mixed side: Less foraging behavior in open part of pond, more in cattails (vegetation cover)
  + Bluegill side: Foraged in open and cover areas
  + Consequence in growth rate, bluegill foraging only in vegetation grew more slowly than those foraging throughout pond.
  + They tested with 3 size classes of bluegill: smallest showed largest response, largest did not show response, still foraged in mixed pond open area. Hypothesis was the gape limit of bass. Large bluegill are not at risk of predation.

**Intraspecific competition**

**Emigration**: one way, the individual leaves and does not come back.

Nelson *et* al. paper on mice emigration in a lab setting

* How does the presence of **conspecifics** affect the choice of habitat?
  + Presence of conspecifics matters and can prevent immigration of others (territorial behavior)
  + Javan believes that the presence of conspecifics preventing others from inhabiting a habitat should be the null hypothesis when looking at wild systems.
  + Someone else getting there first can be the only thing preventing an area from being considered habitat to a conspecific. Everything else could be perfect, but it already inhabited by someone else.

On the flipside, in some systems, conspecifics could indicate where there is a good resource.

Allee effect: system needs a certain number of conspecifics to persist, if that number falls too low, leads to negative effects for population.