A forager searches for two prey types simultaneously; items are encountered sequentially. While searching, the forager encounters type-1 items at rate 0.5 items/unit time. Type-2 items are encountered at rate 1 item/unit time. Net energy yields for the two prey types are equal. Handling time for a type-1 item is 3 time units. Handling time for a type-2 item is 4.5 time units. To maximize its mean rate of energy gain, the forager should:

A) specialize on type-1 prey B) specialize on type-2 prey C) take both prey types

Identify parameters

$E_1 = E_2 = e$; minimize time/item

$\lambda_1 = ½; \lambda_2 = 1$ $h_1 = 3; h_2 = 4.5$

More profitable?

$e/h_1 = 1/3 > 1/(4.5) = e/h_2$

Know: Don't specialize on type-2

Specialize on type-1 ?

$h_2 > (1/\lambda_1) + h_1$; $4.5 > 2 + 3$?

Know: Generalize

Again, a forager searches for two prey types simultaneously; items are encountered sequentially. Encounter rates are λ_i (i = 1, 2), net energy yields per item are E_i (i = 1, 2), and the handling times are h_i (i = 1, 2). Consider the following parameters:

$\lambda_1 = 1/3$, $E_1 = 3$, $h_1 = 2$; & $\lambda_2 = 1/2$, $E_2 = 6$, $h_2 = 6$

To maximize the average rate of energy gain, the forager should:

A) specialize on type-1 prey
B) specialize on type-2 prey C) generalize

More profitable?

$E_1/ h_1 = 3/2 > E_2/ h_2 = 6/6 = 1$

Know: Don't specialize on type-2

Specialize on type-1 ?

$(E_1/E_2)\, h_2 > (1/\lambda_1) + h_1$

$(3/6)\, 6 > 3 + 2$?

Know: Generalize