Organic Thresholds & Scouting: Part 1

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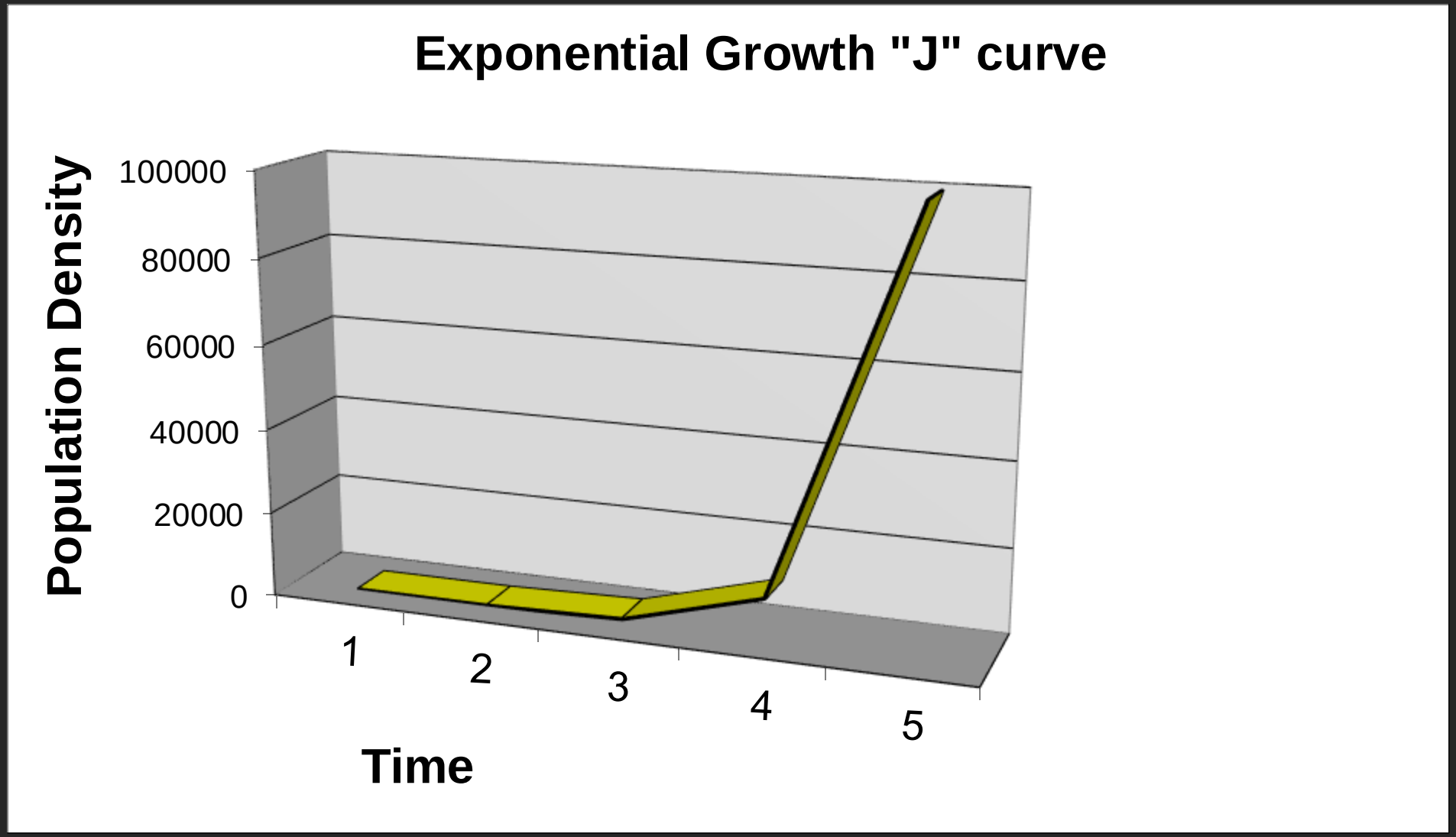
Population Characteristics

Density curves: Tracking population densities through time (= monitoring)

Insect population densities change through time at regular rates and thus produce curves on graphs with a particular shape

Population Characteristics



Whiteflies on Melon

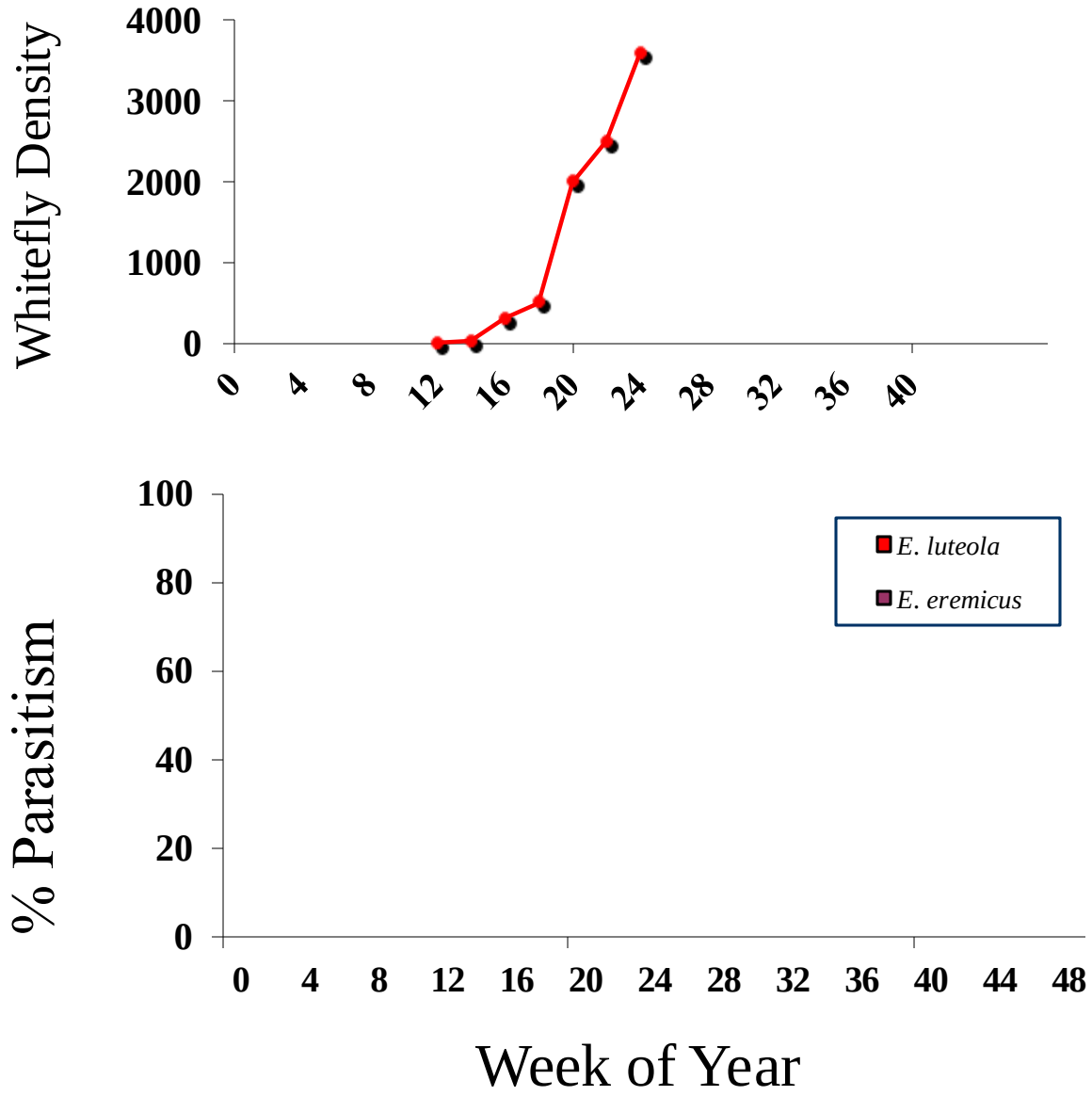
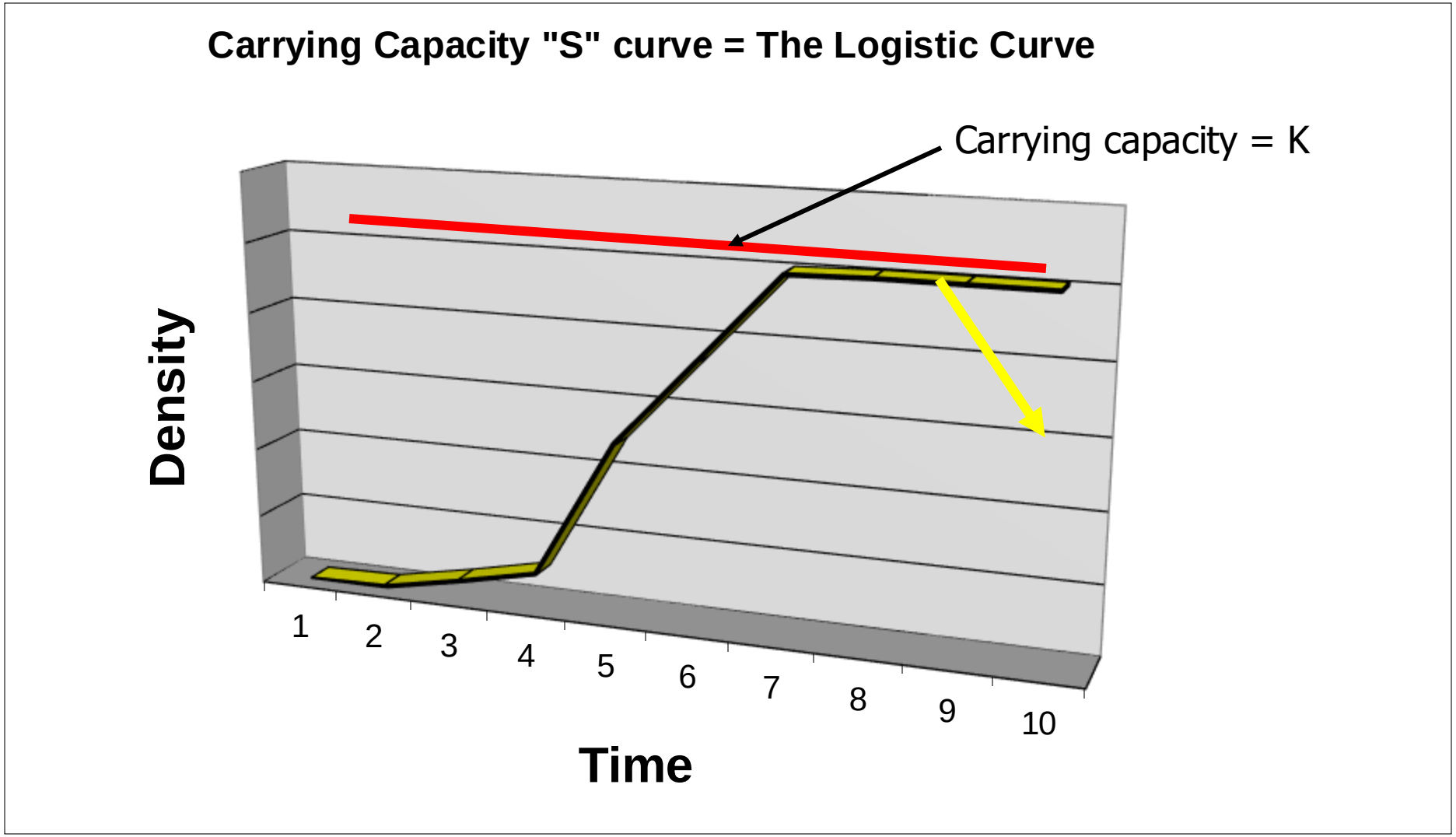


Photo by Tom Perring, UC Riverside

Imperial Valley melon crop destroyed by whiteflies

Population Characteristics

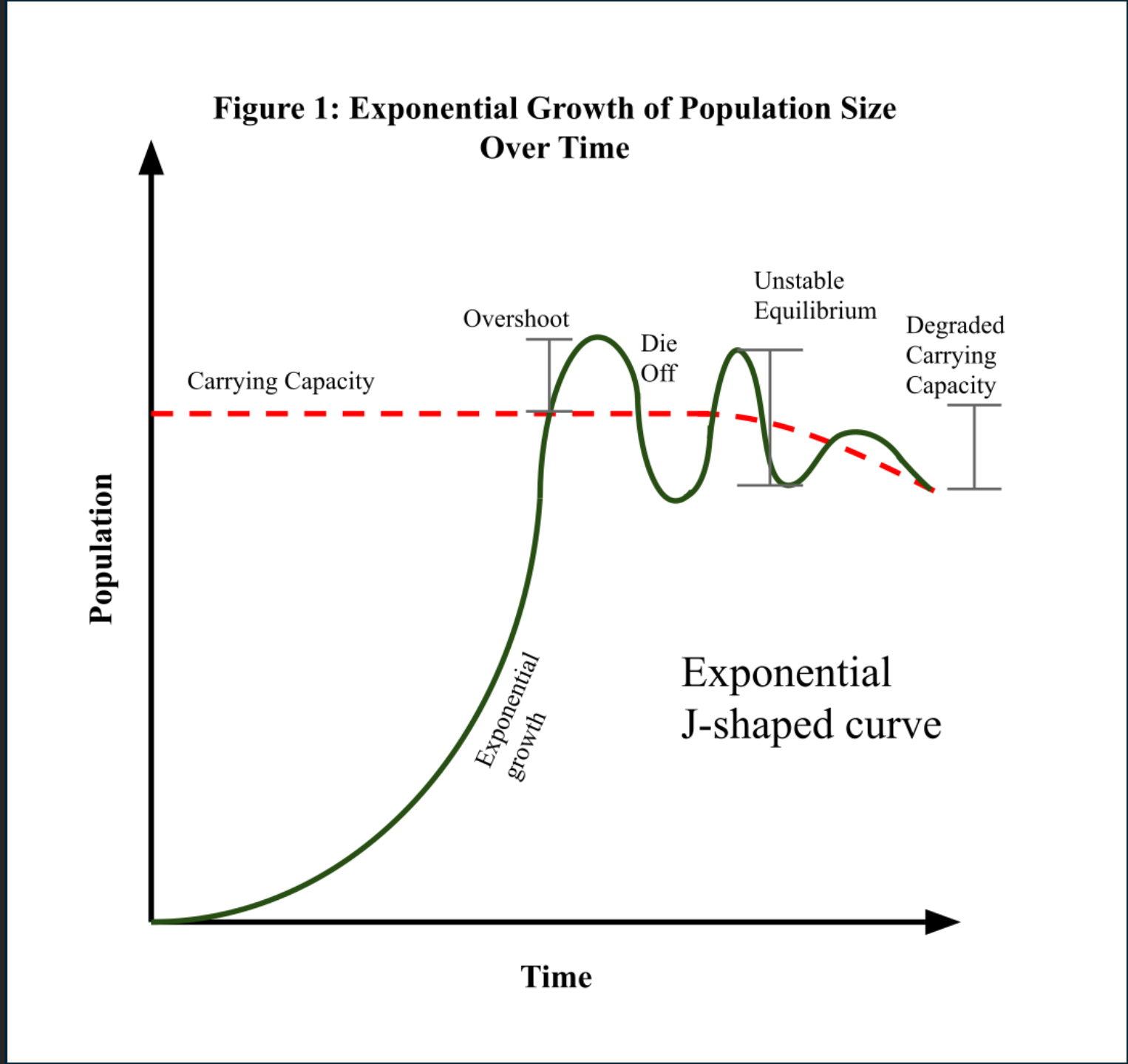


Population growth outcomes

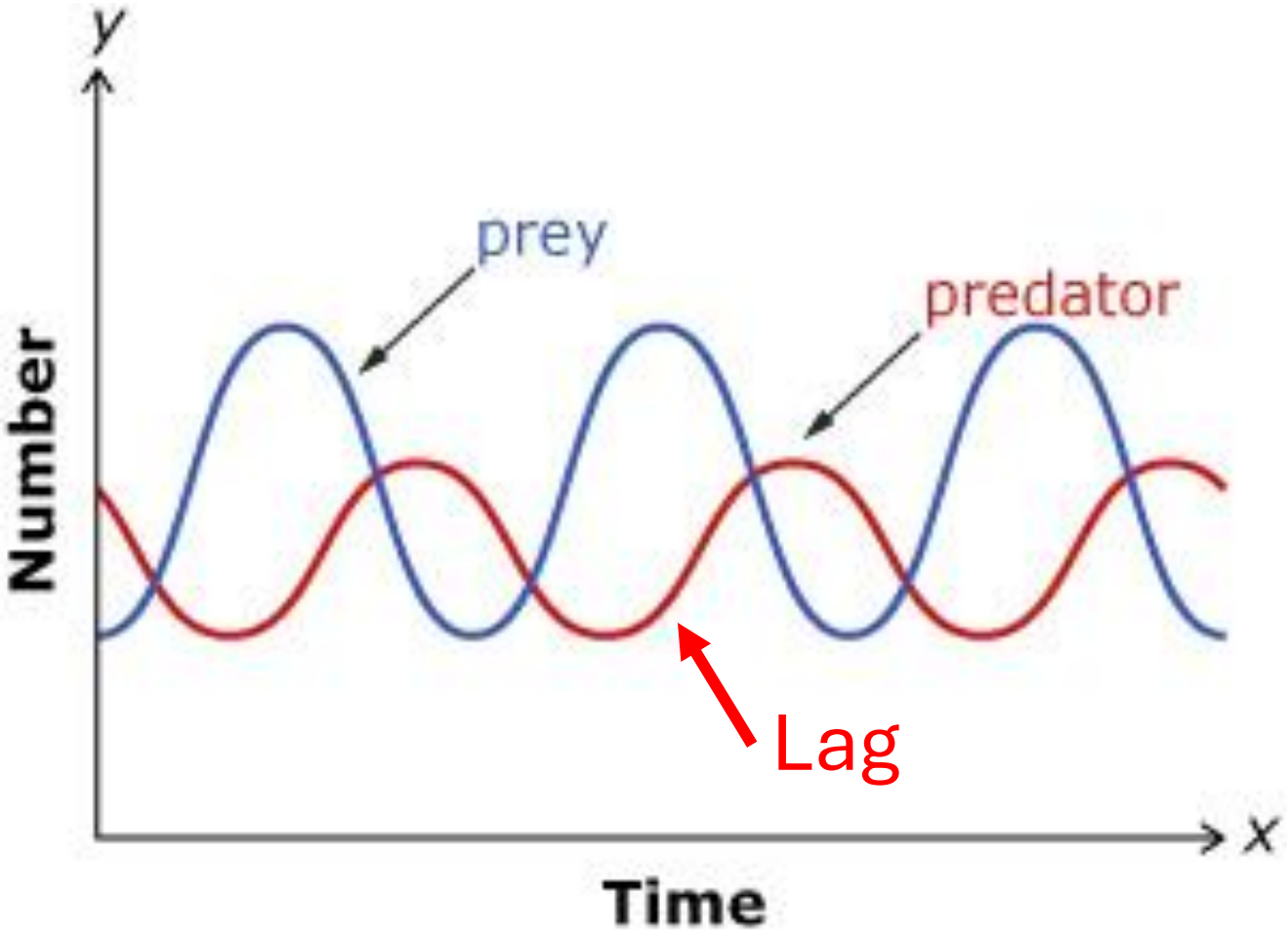
Carrying capacity is not static

Increases with better/more abundant resources

Decreases with resource degradation

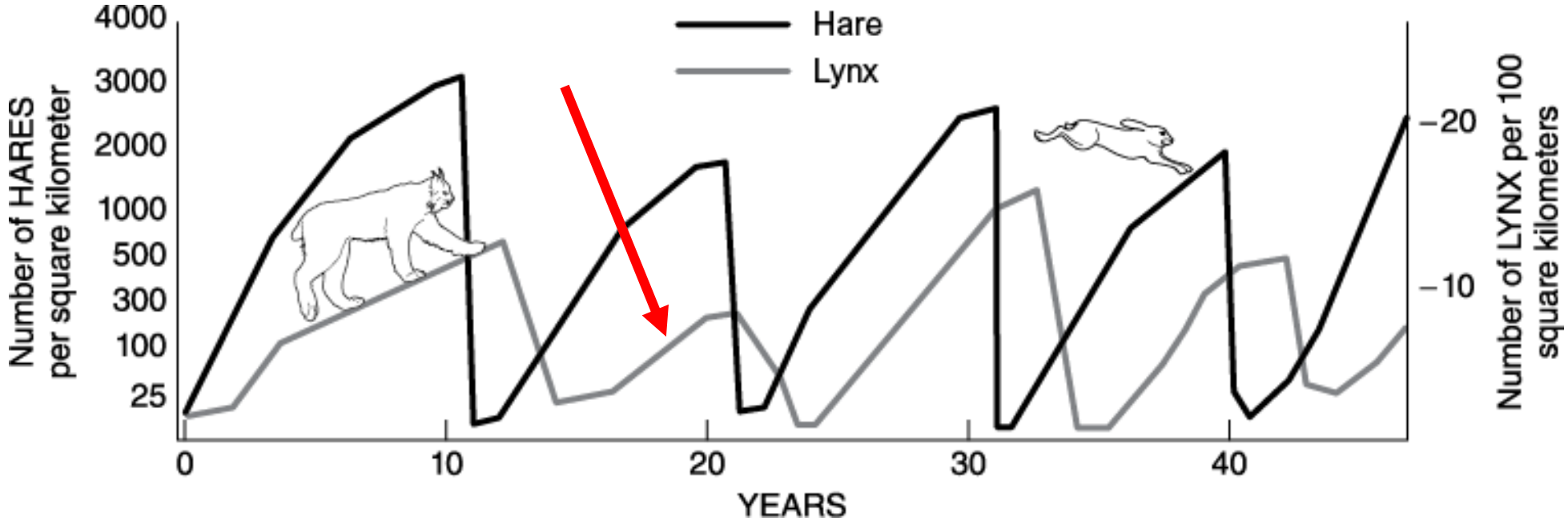


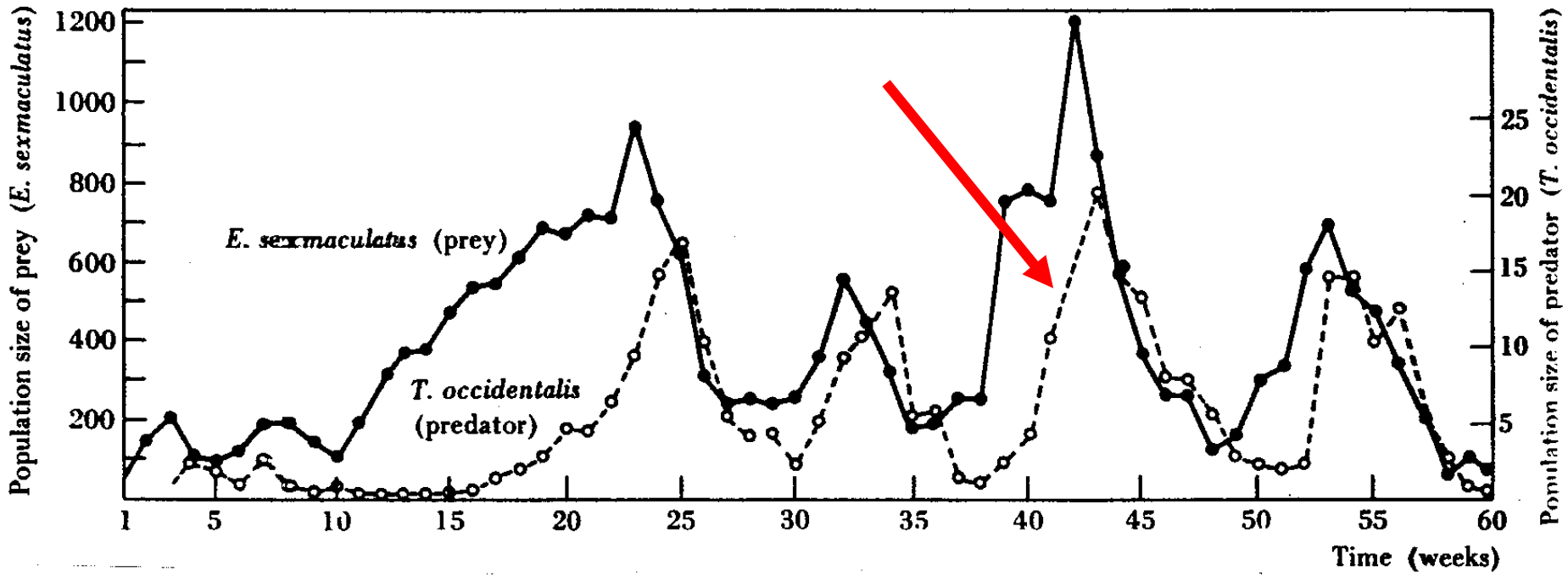
Predator Prey Interactions



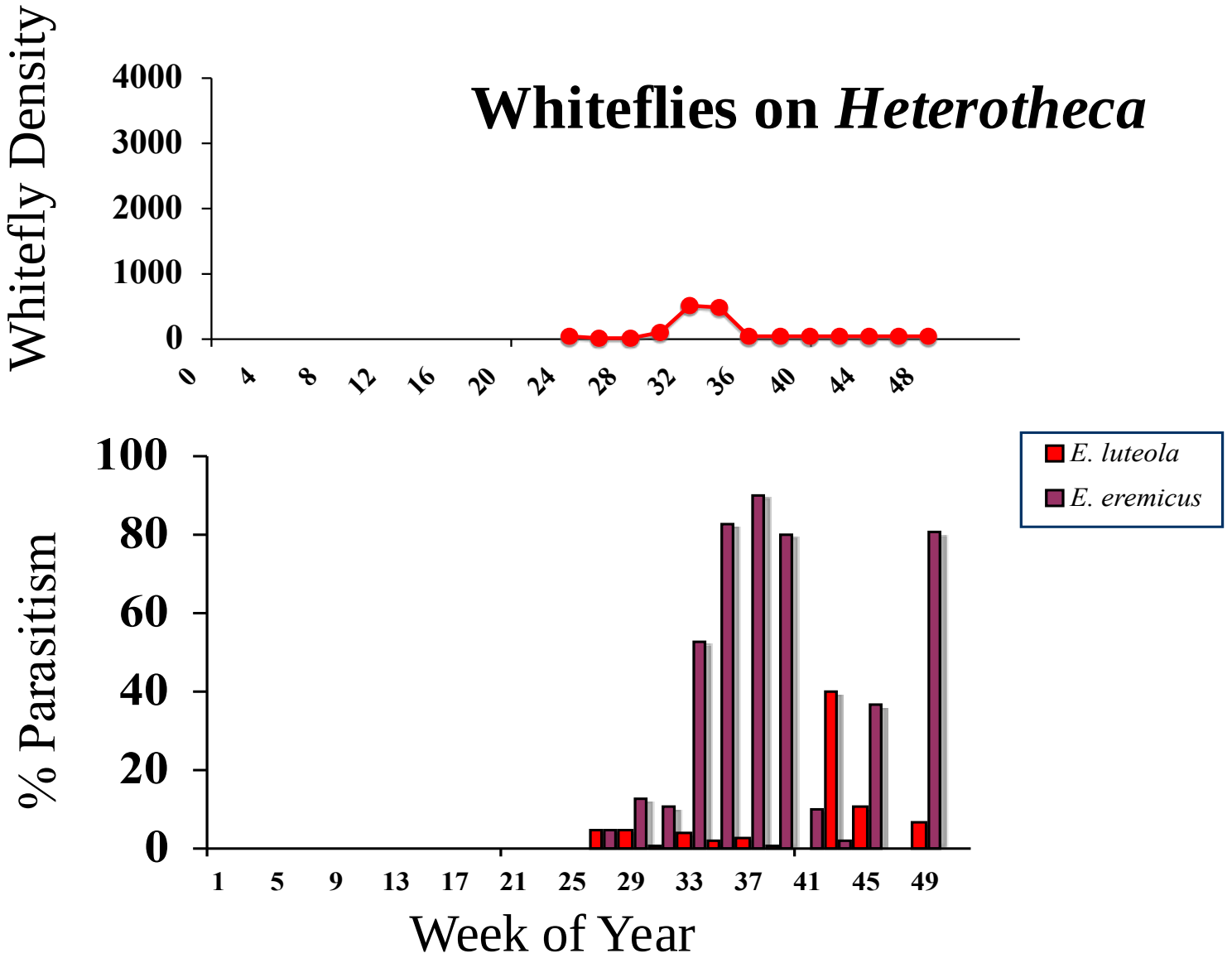
Timing issues

Naturally occurring and introduced predators and parasitoids have population lags


Hare
Lynx
Number of HARES per square kilometer
Number of LYNX per 100 square kilometers
4000
3000
2000
1000
500
300
100
25
20
10
0
10
20
30
40
YEARS


Population size of prey (E. sexmaculatus)
Population size of predator (T. occidentalis)
E. sexmaculatus (prey)
T. occidentalis (predator)
1200
1000
800
600
400
200
25
20
15
10
5
1
5
10
15
20
25
30
35
40
45
50
55
60
Time (weeks)

Natural Enemy Effects



Whiteflies on Cotton

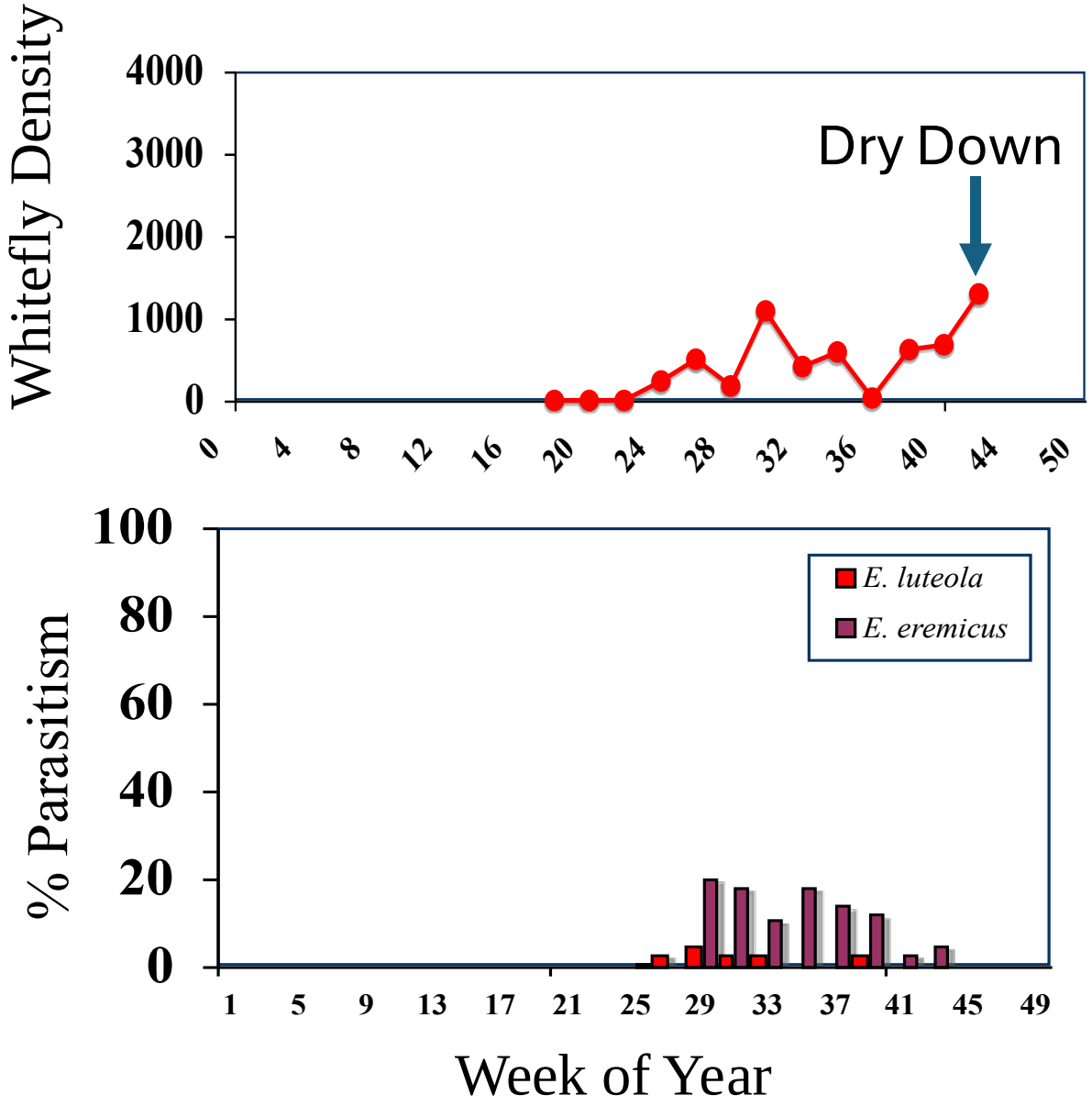
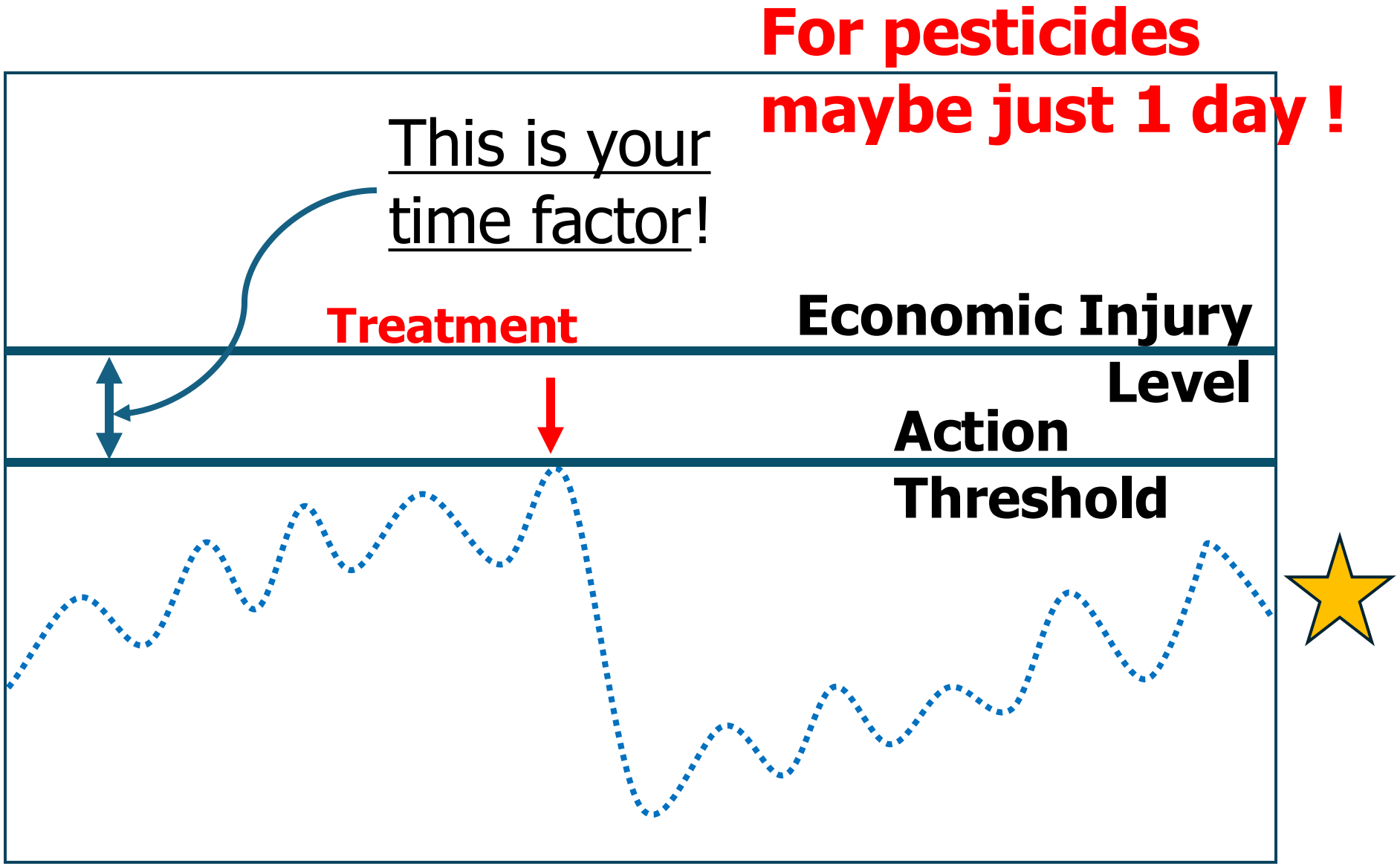


Photo by Joseph LaForest, University of Georgia; bugwood.org

Monitoring

- Keeping track of multiple pests on multiple crops = Whole-Farm Scouting
- Thresholds
- Timing of pest management applications
- Monitoring data records population densities that inform types of treatment options

Thresholds


For pesticides
maybe just 1 day !
This is your
time factor!
Treatment
Economic Injury
Level
Action
Threshold

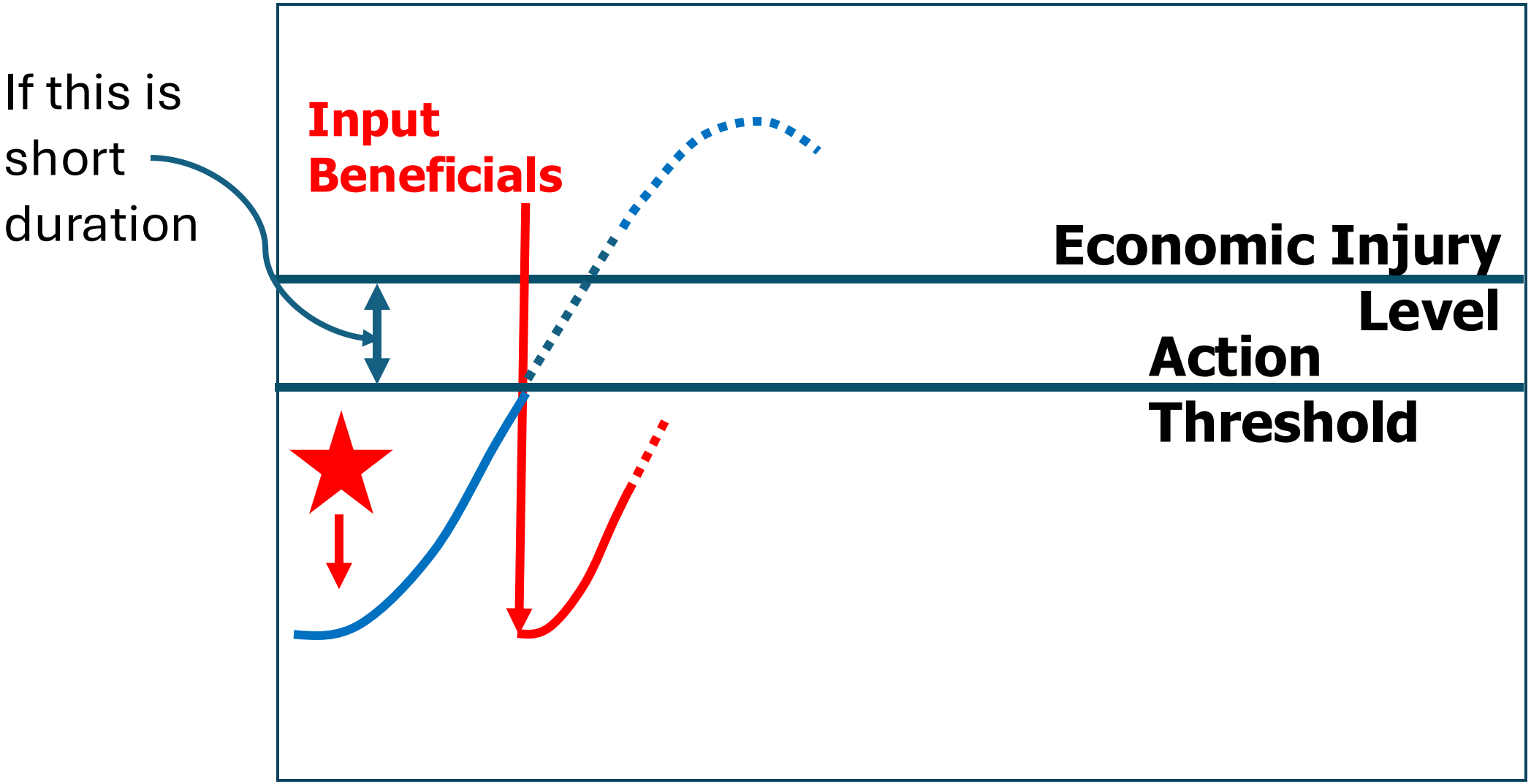
Thresholds

- Quantifiable or not?

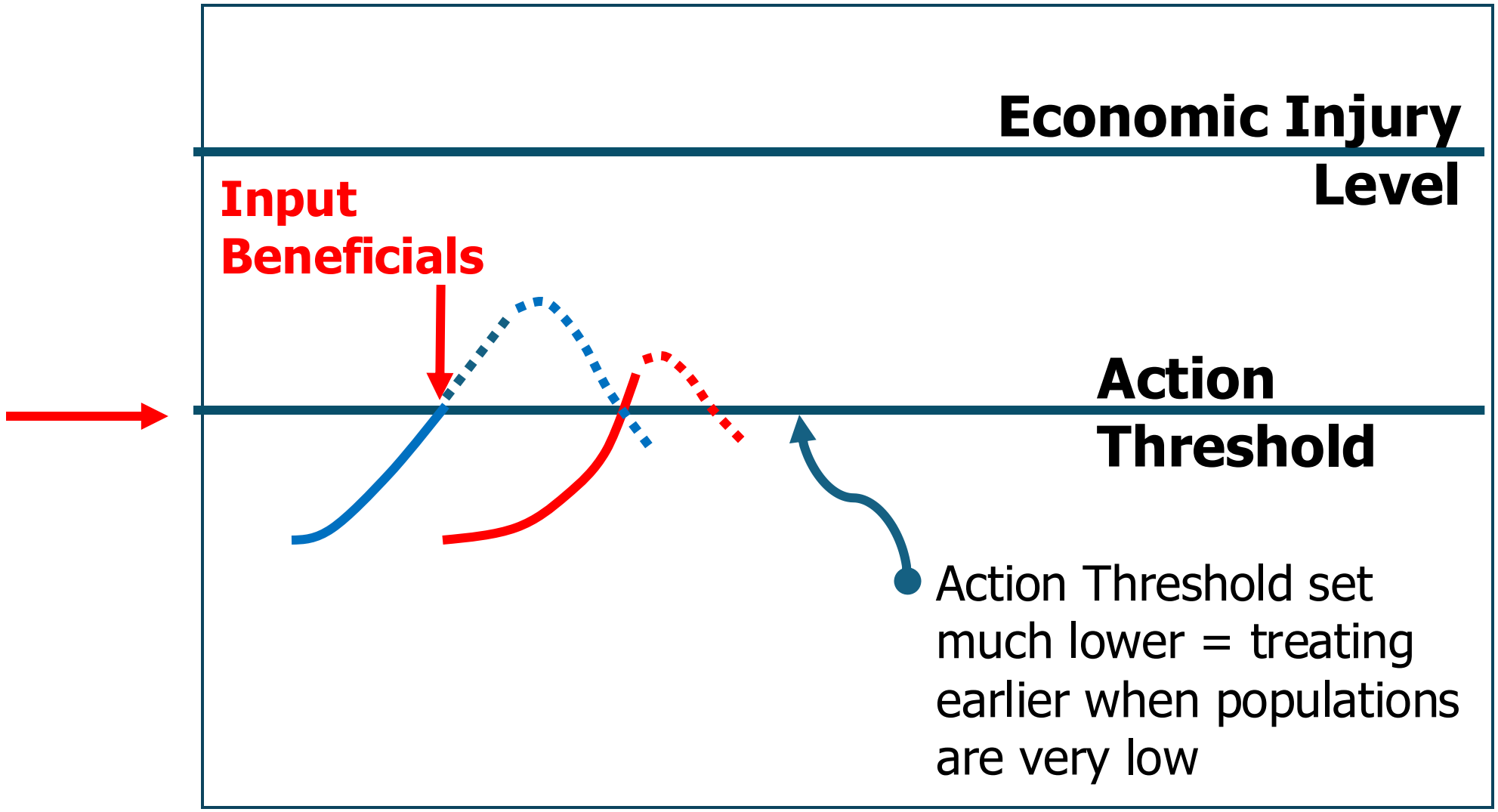
- Lack of meaningful thresholds for most pests and cropping systems is a well-known gap that can be bridged by consistent monitoring

- Nominal Thresholds or “Sleep at night” threshold

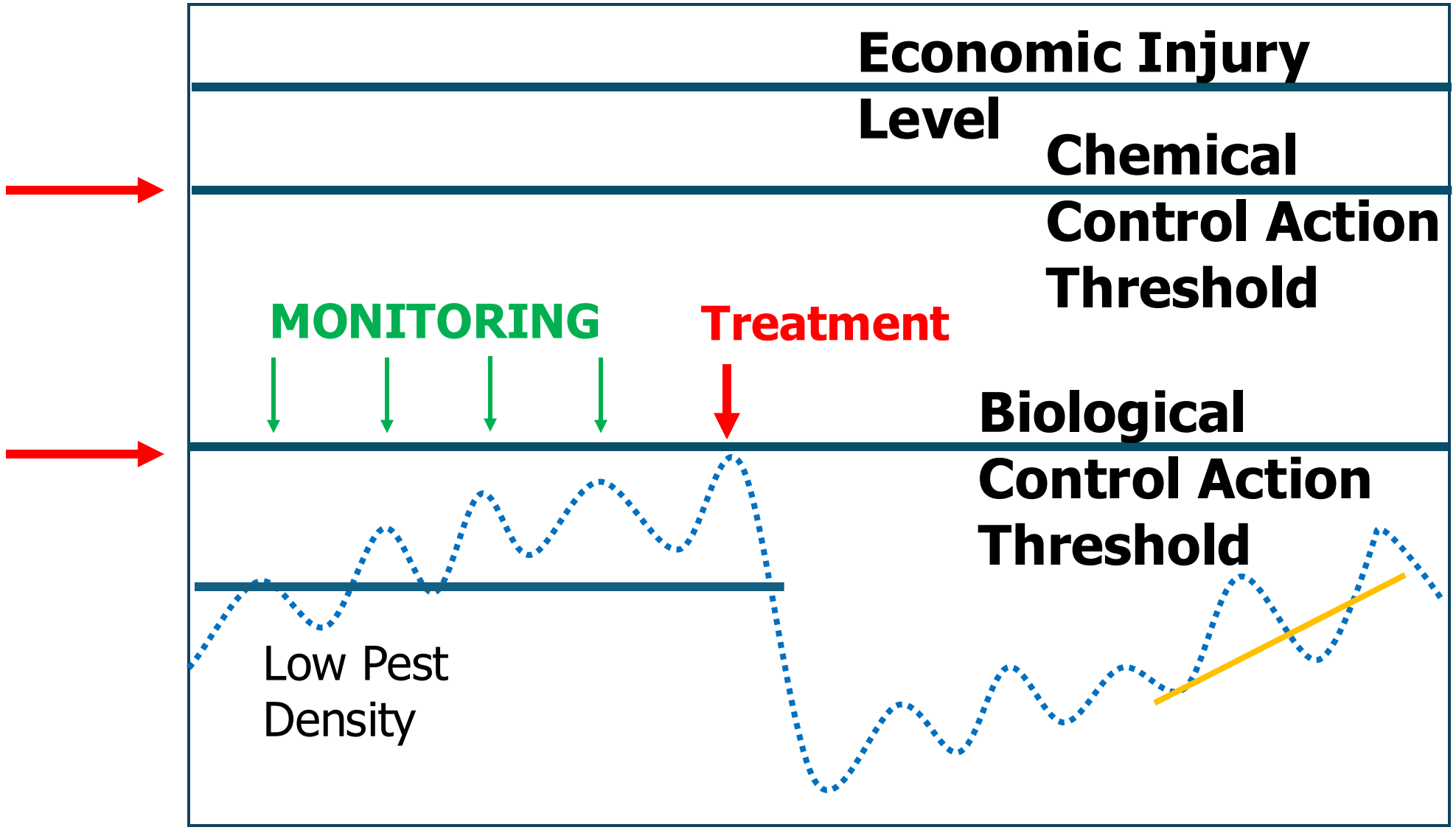
Timing for Biological Controls



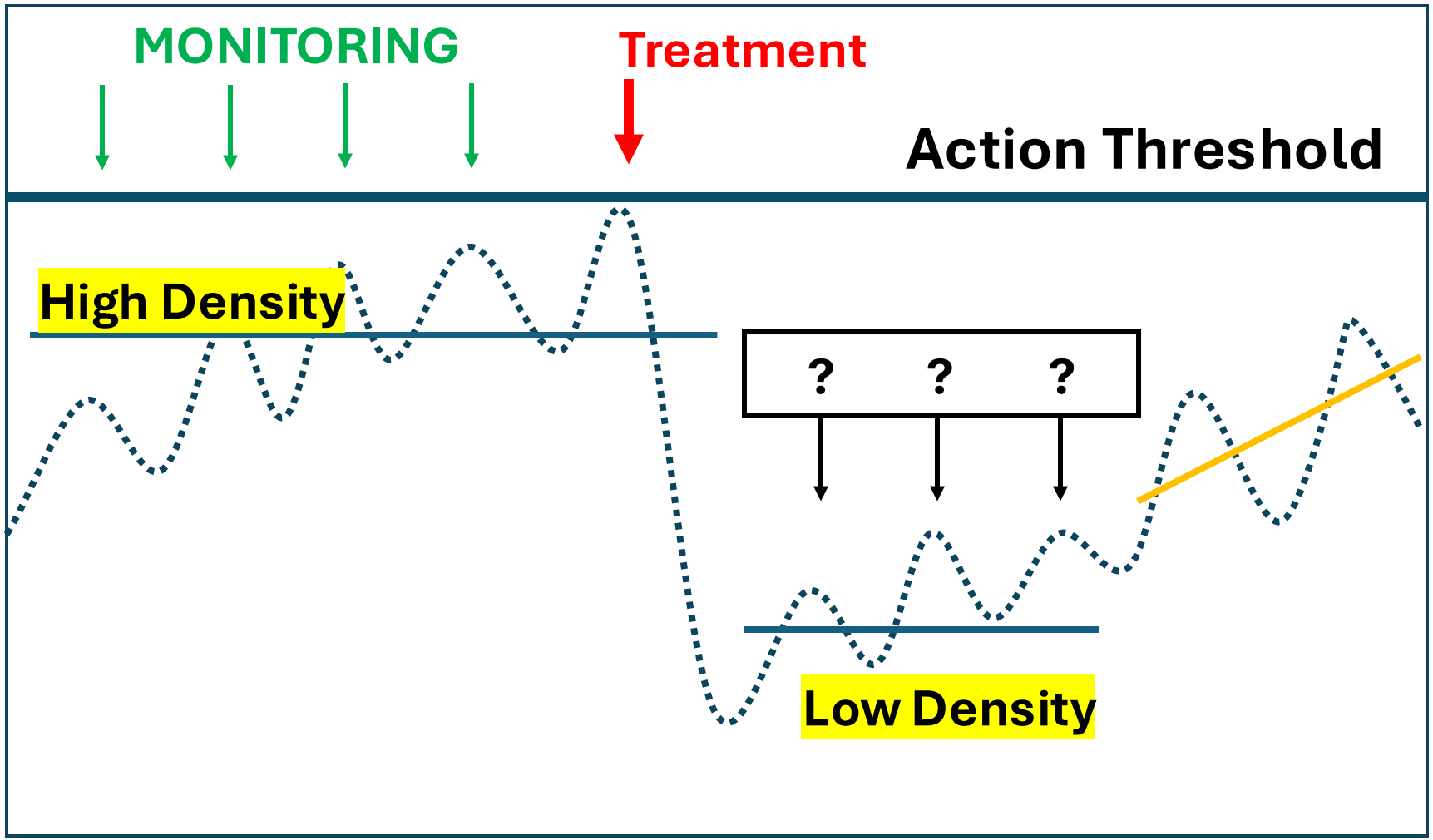
Timing for Biological Controls



Thresholds


Economic Injury
Level
Chemical
Control Action
Threshold
MONITORING
Treatment
Biological
Control Action
Threshold
Low Pest
Density

Categorizing techniques



Categorizing Techniques

High density pest populations responses:

- Pesticides, Pheromone disruption, Mass trapping, Crop rotation…

Maintaining low density pest populations:

- Biological control – augmentation & conservation (insectary plants/hedge rows); Host plant resistance, Plant health, Avoid high nitrogen…