

Population Interactions

CHAPTER 11.1.4: ORGANISMS AND POPULATIONS



There is no natural habitat on earth inhabited by just a single species. Even a plant needs soil microbes to break down organic matter and animal agents for pollination. Every species is part of an **interactive web**.

The Nature of Interspecific Interactions

Interactions arising from the populations of two different species.

- Animals, plants, and microbes cannot live in isolation; they interact to form a biological community.
- Even in minimal communities, numerous interactive linkages exist, though some may not be readily apparent.





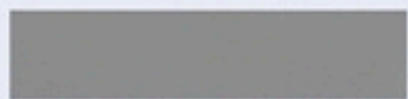
Beneficial.

The species gains an advantage (e.g., food, shelter, reproduction).



Detrimental.

The species suffers harm, energy loss, or population reduction.



Neutral.

The species is neither harmed nor benefited.



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$$E=mc^2$$



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The Ecological Interaction Matrix

		Species A		
		+	−	0
Species B	+	Mutualism Symmetrical	Predation & Parasitism Asymmetrical	Commensalism Asymmetrical
	−		Competition Symmetrical	Amensalism Asymmetrical
	0	0	−	0

In predation, parasitism, and commensalism, the interacting species live closely together.

Mutualism

(+, +)

Both interacting species confer benefits on each other.

Example: Mediterranean orchid *Ophrys* and bee (sexual deceit).



Competition

(-, -) 
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Fitness of one species is significantly lower in the presence of another species.

Example: Superior barnacle *Balanus* excludes smaller *Chthamalus* (Competitive Release).

Predation

(+, -)

Transfer of energy fixed by plants to higher trophic levels; keeps prey populations under control.

Example: Starfish *Pisaster* in rocky intertidal areas maintaining species diversity.

Parasitism

(+, -)

One species ensures free lodging and meals at the expense of the host's survival.

Example: Cuckoo (koel) laying eggs in a crow's nest (Brood parasitism).

Interactions with a Neutral Party

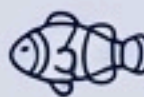
Commensalism

+ / 0

One species benefits while the other is neither harmed nor benefited.

NCERT Examples:

- An orchid growing as an epiphyte on a mango branch.
- Barnacles growing on the back of a whale.
- Cattle egret foraging close to grazing cattle.
- Clown fish living among sea anemone tentacles.



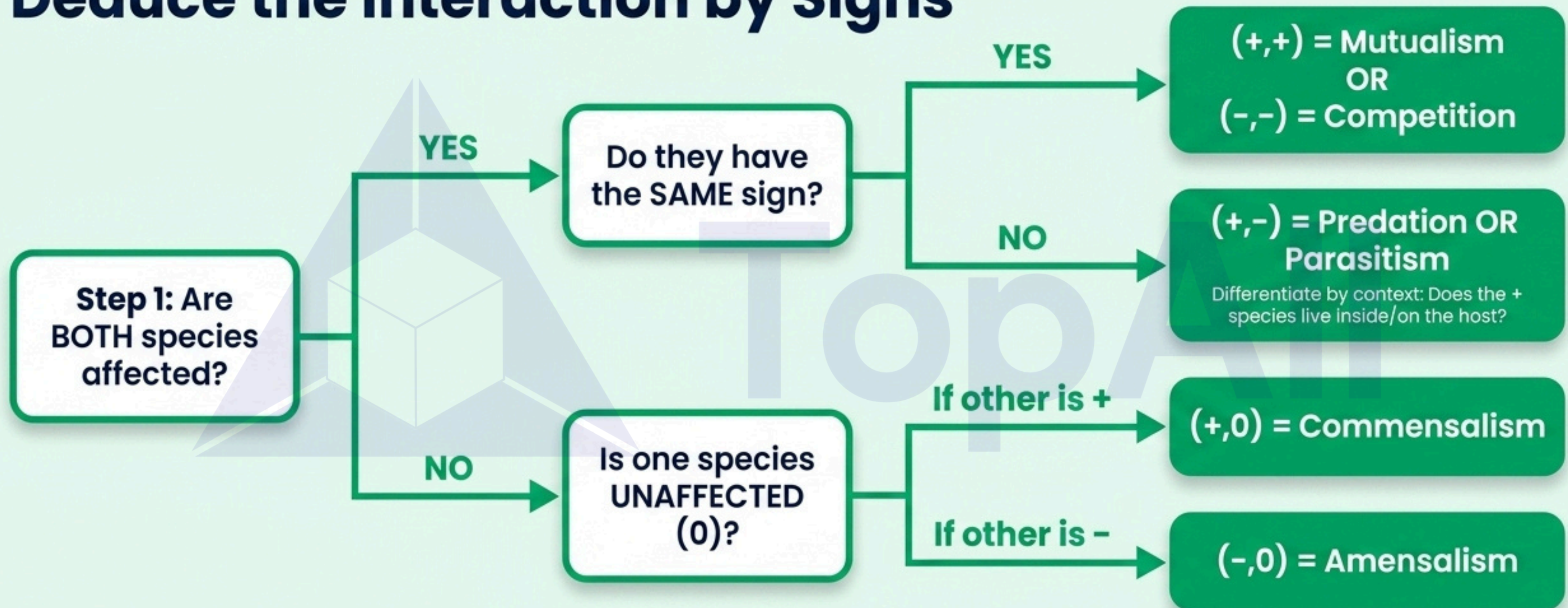
Amensalism

- / 0

One species is harmed whereas the other is unaffected.

Note: The NCERT text introduces the term but focuses heavily on the other five interactions for specific examples.

NEET Key Takeaway: Deduce the Interaction by Signs



Rule of Thumb: In +,- and +,0 interactions, the species typically live closely together.



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