Early life cycle of *Neocalanus flemingeri* and *Neocalanus plumchrus* in the Oyashio region, western north Pacific

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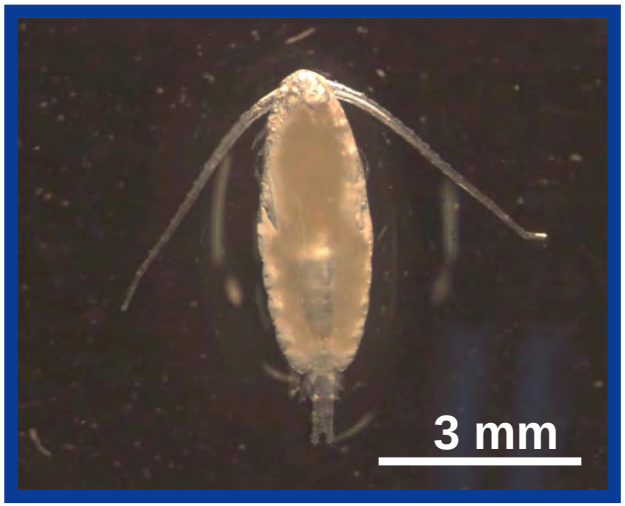
[1]Atmosphere and Ocean Research Institute, Univ. of Tokyo

[2]Academia Sinica

Neocalanus flemingeri, cristatus, plumchrus

Neocalanus flemingeri

Neocalanus cristatus



Neocalanus plumchrus

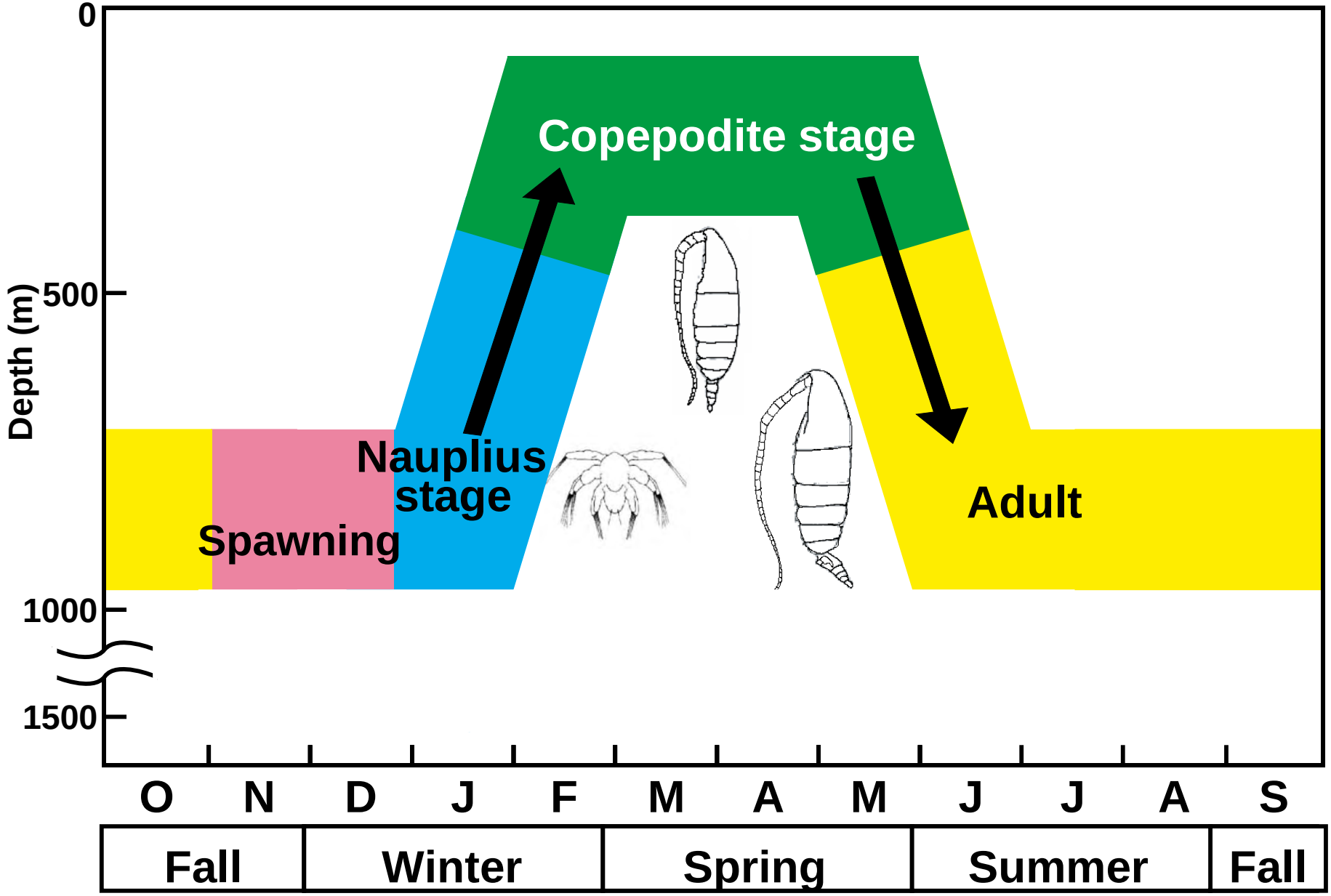
- **Dominate the mesozooplankton biomass through out the subarctic pacific ocean**

(Mackas and Tsuda, 1999)

- **Ontogenetic vertical migration**
  transport large amount of carbon from surface to mesopelagic layer

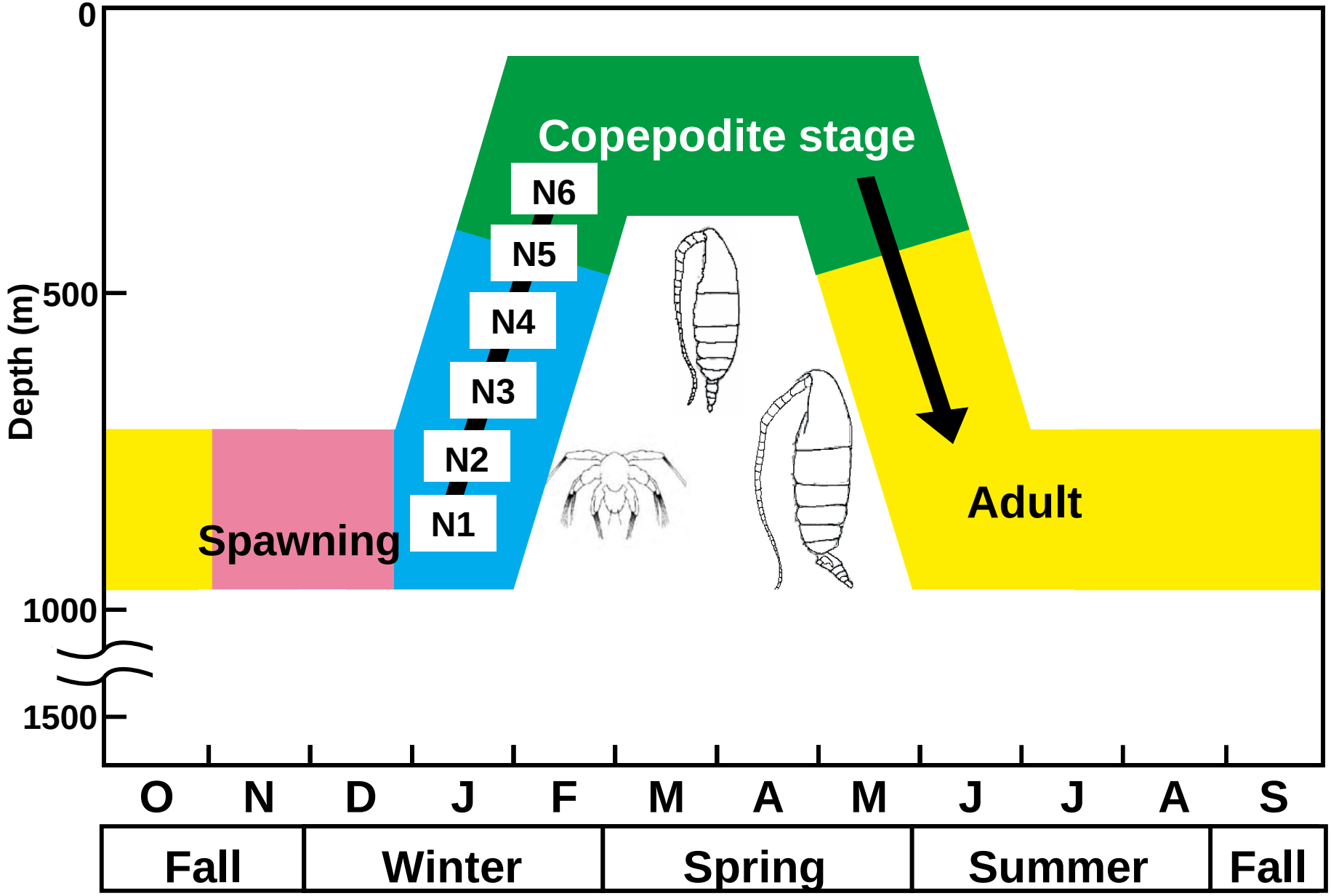
(Kobari et al. 2008)

Life history of 3 *Neocalanus* copepods



(Miller et al. 1984)

Life history of 3 *Neocalanus* copepods



(Miller et al. 1984)

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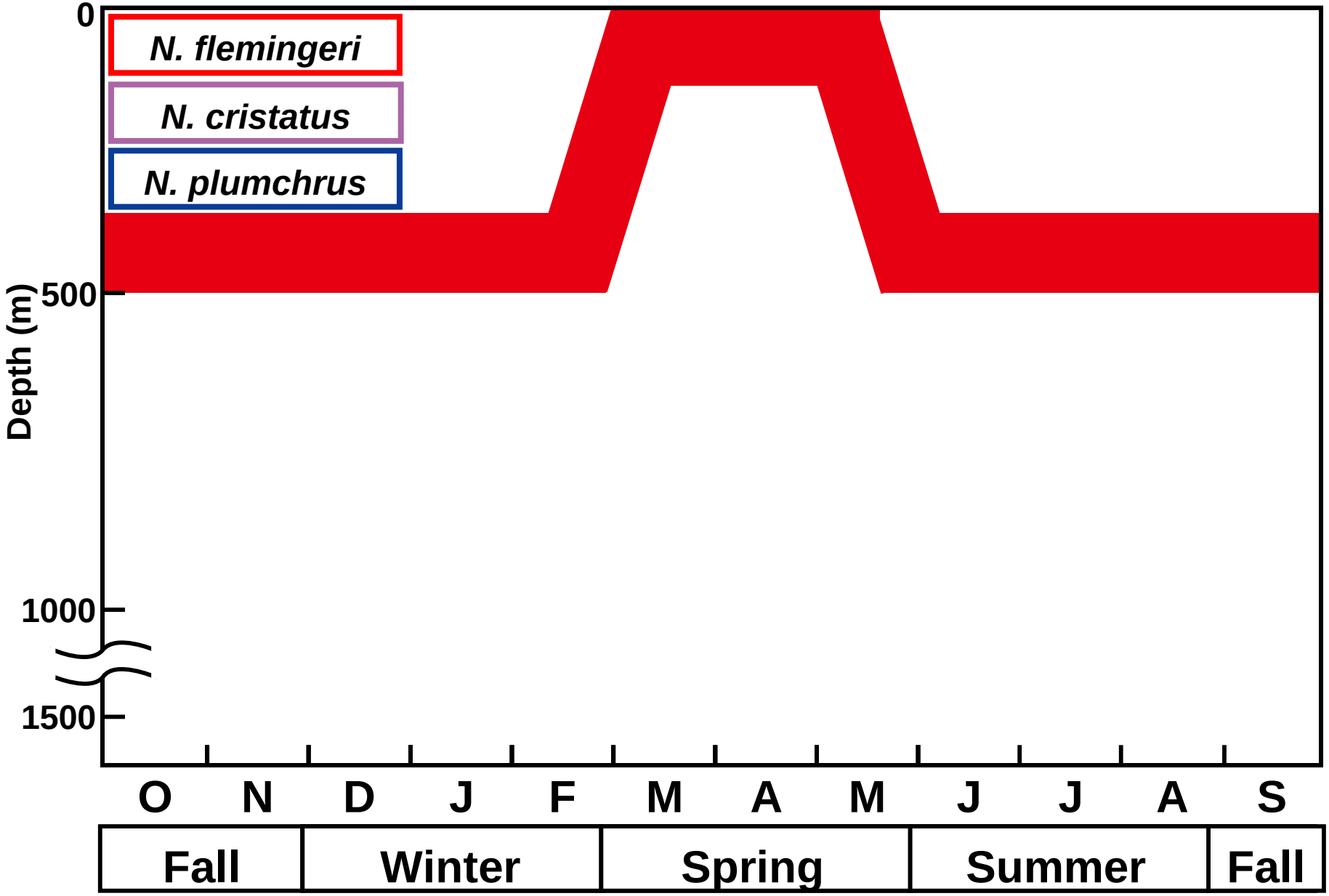

（Tsuda et al. 1999; Kobari and Ikeda 1999, 2001a, 2001b）

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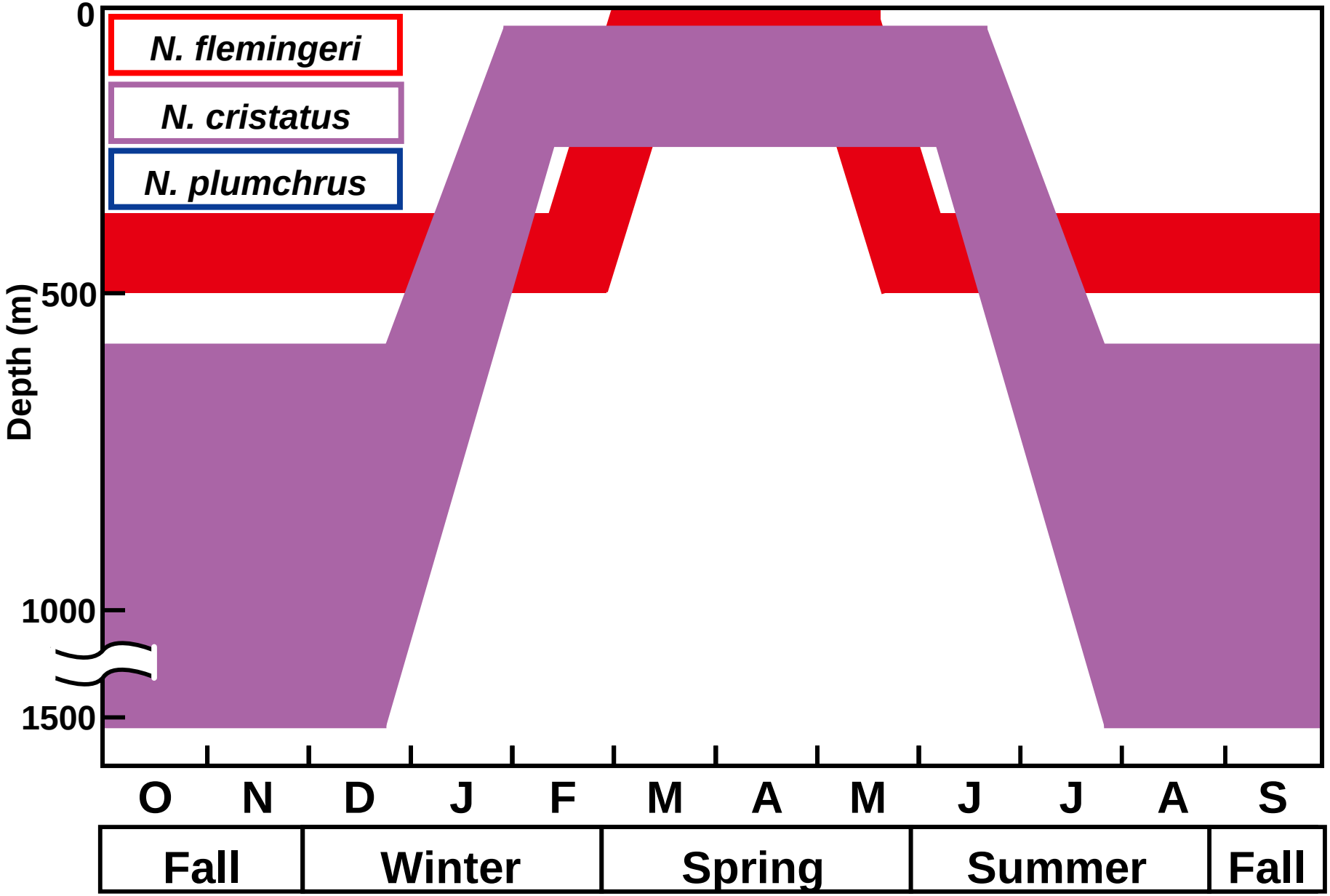

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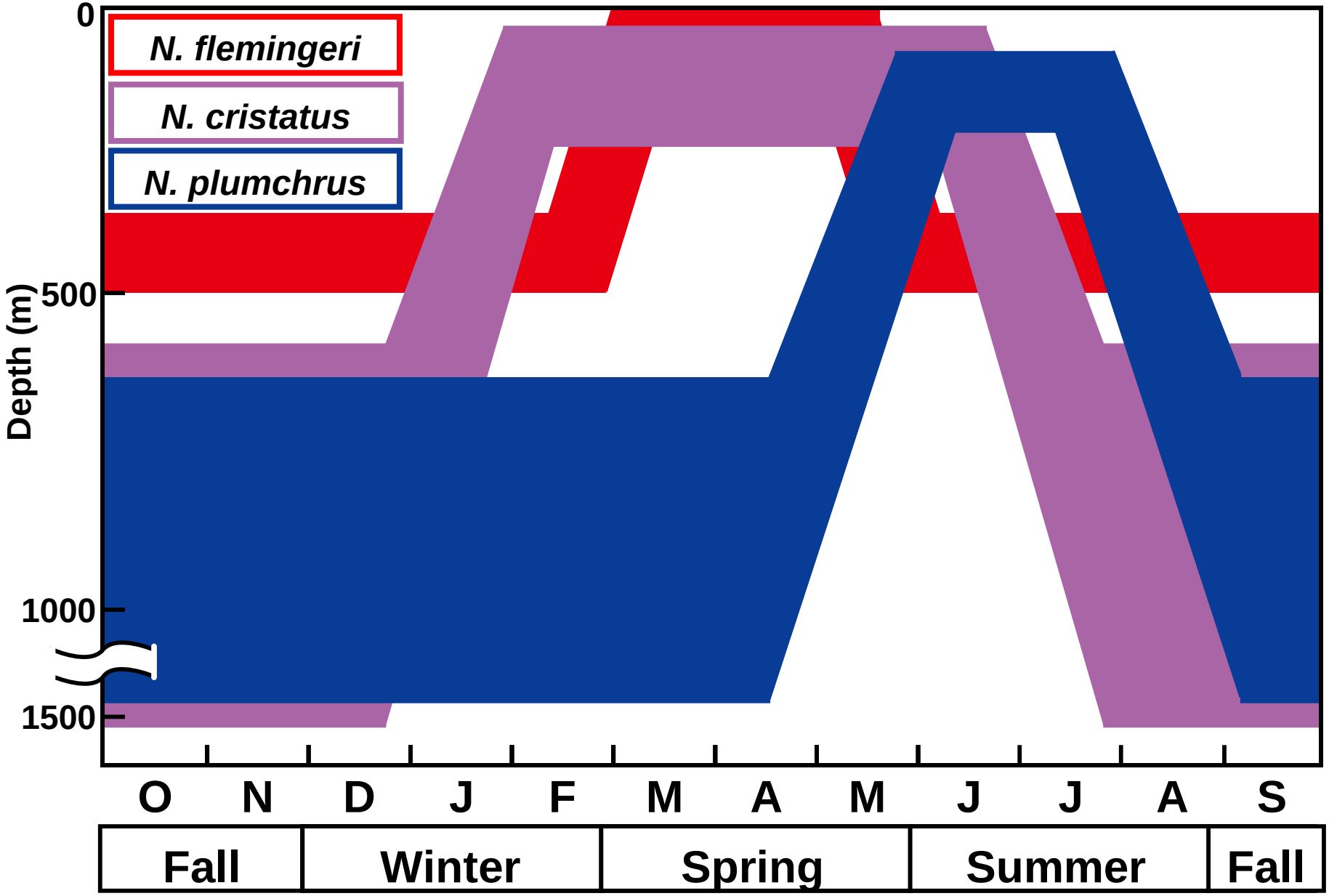

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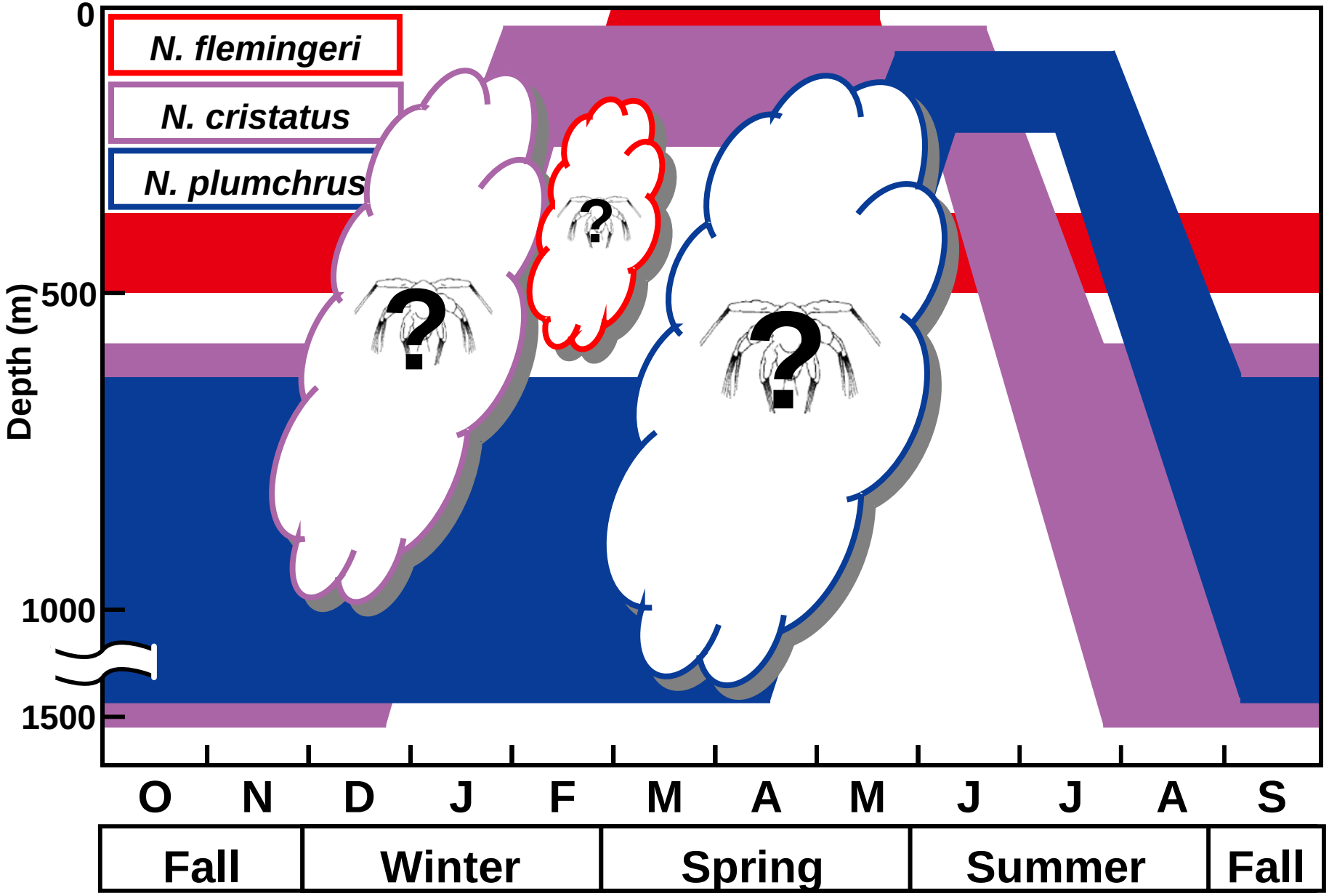

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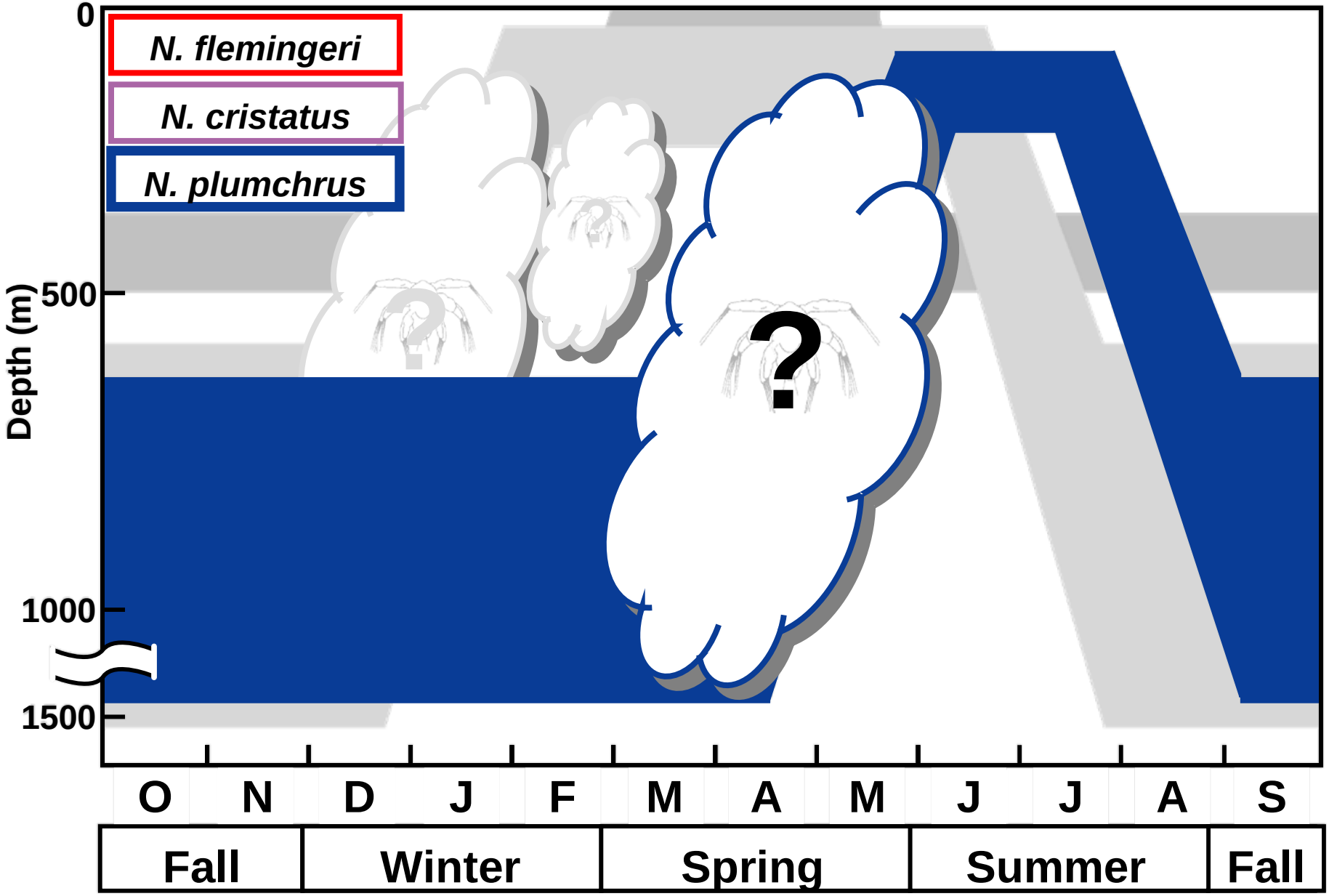

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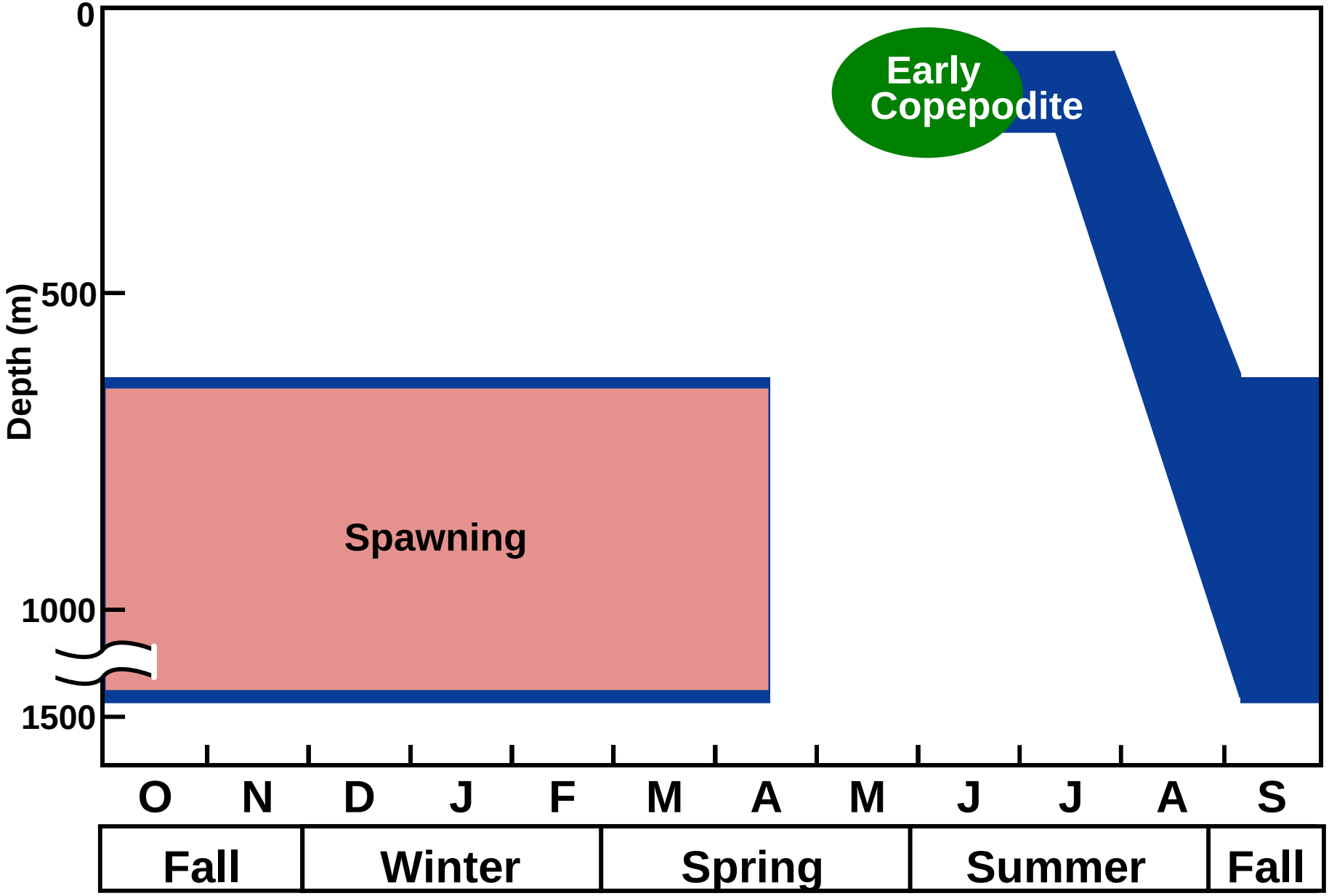
Life history of *Neocalanus plumchrus*



(Tsuda et al. 1999; Kobari and Ikeda 2001a)

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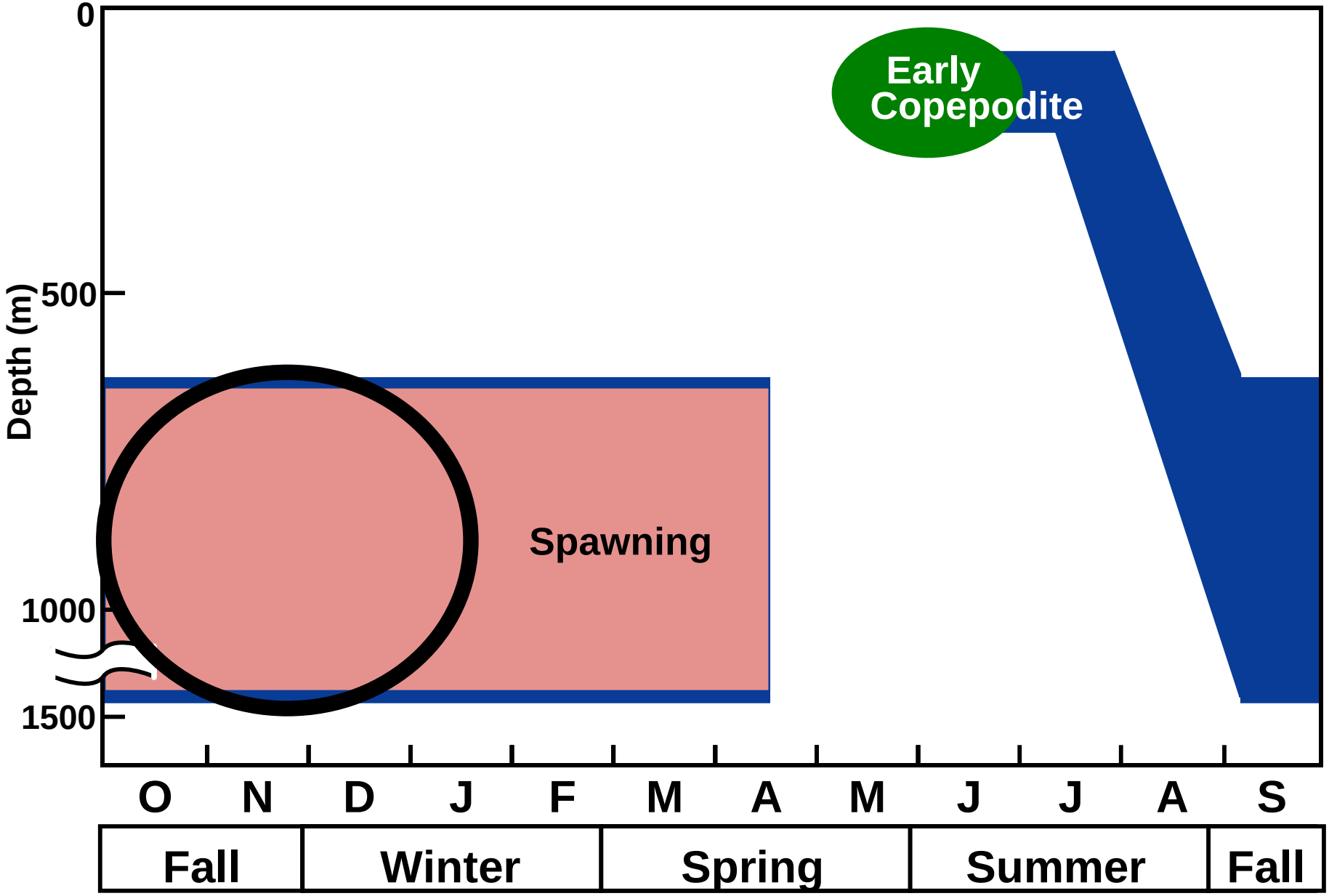

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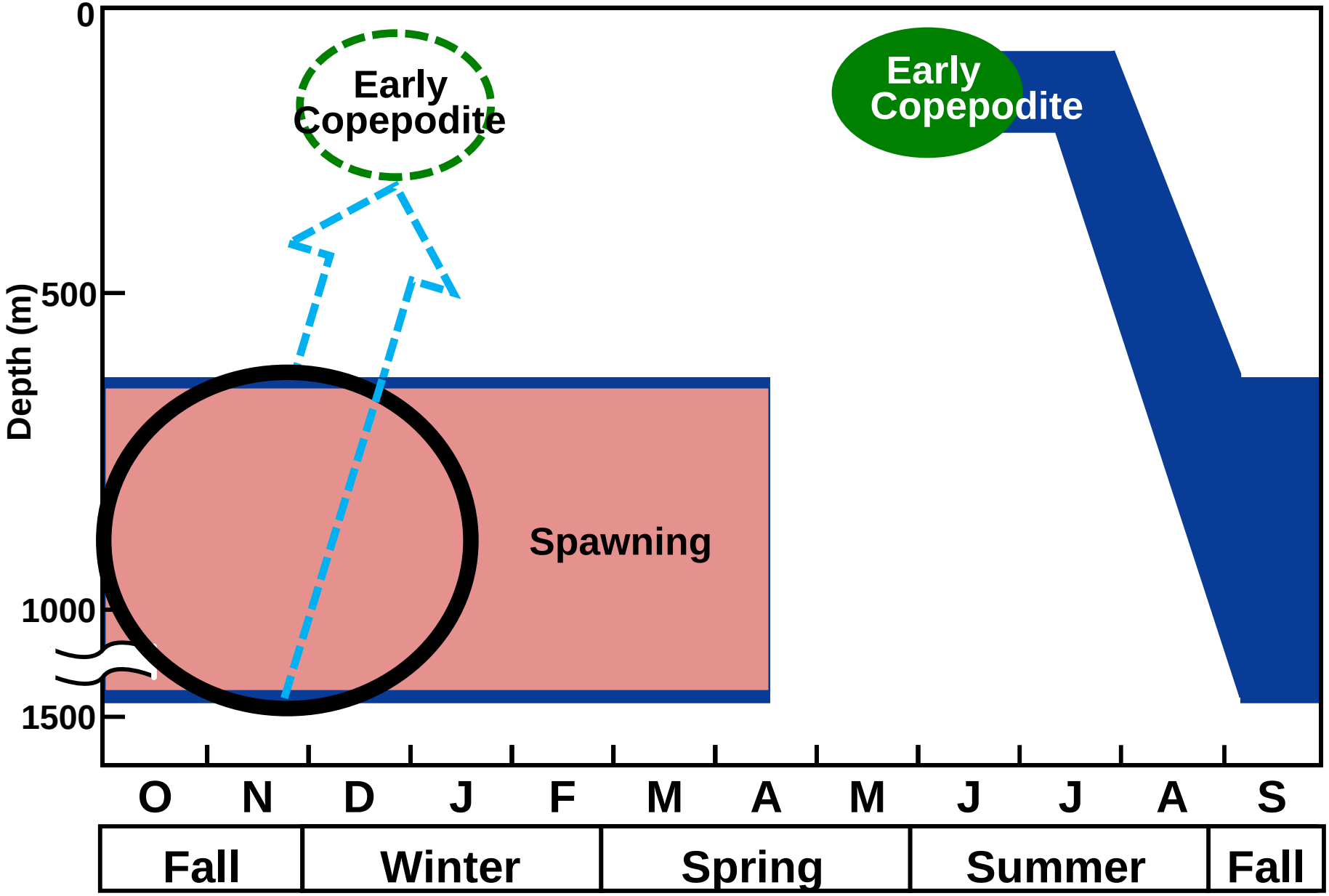

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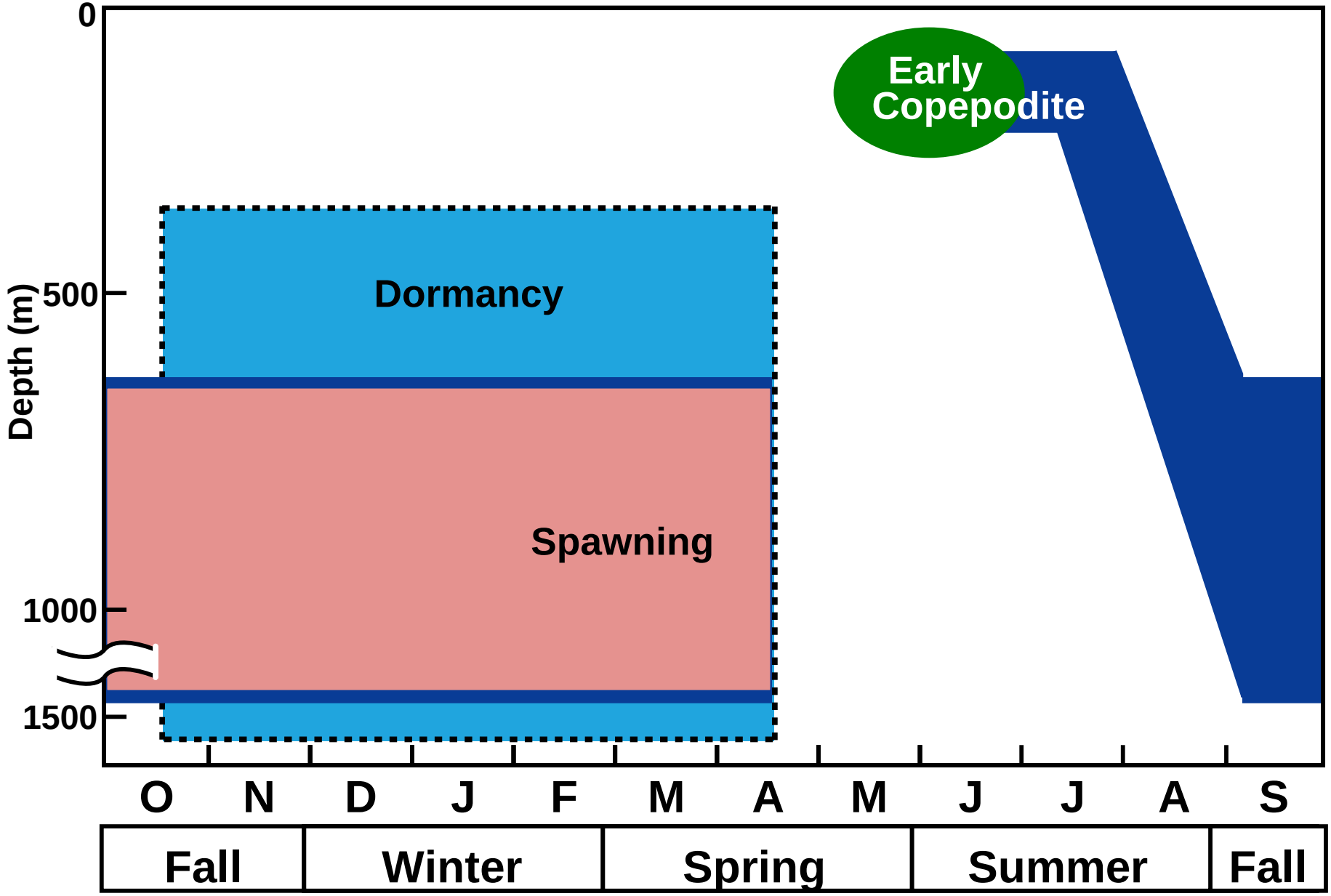

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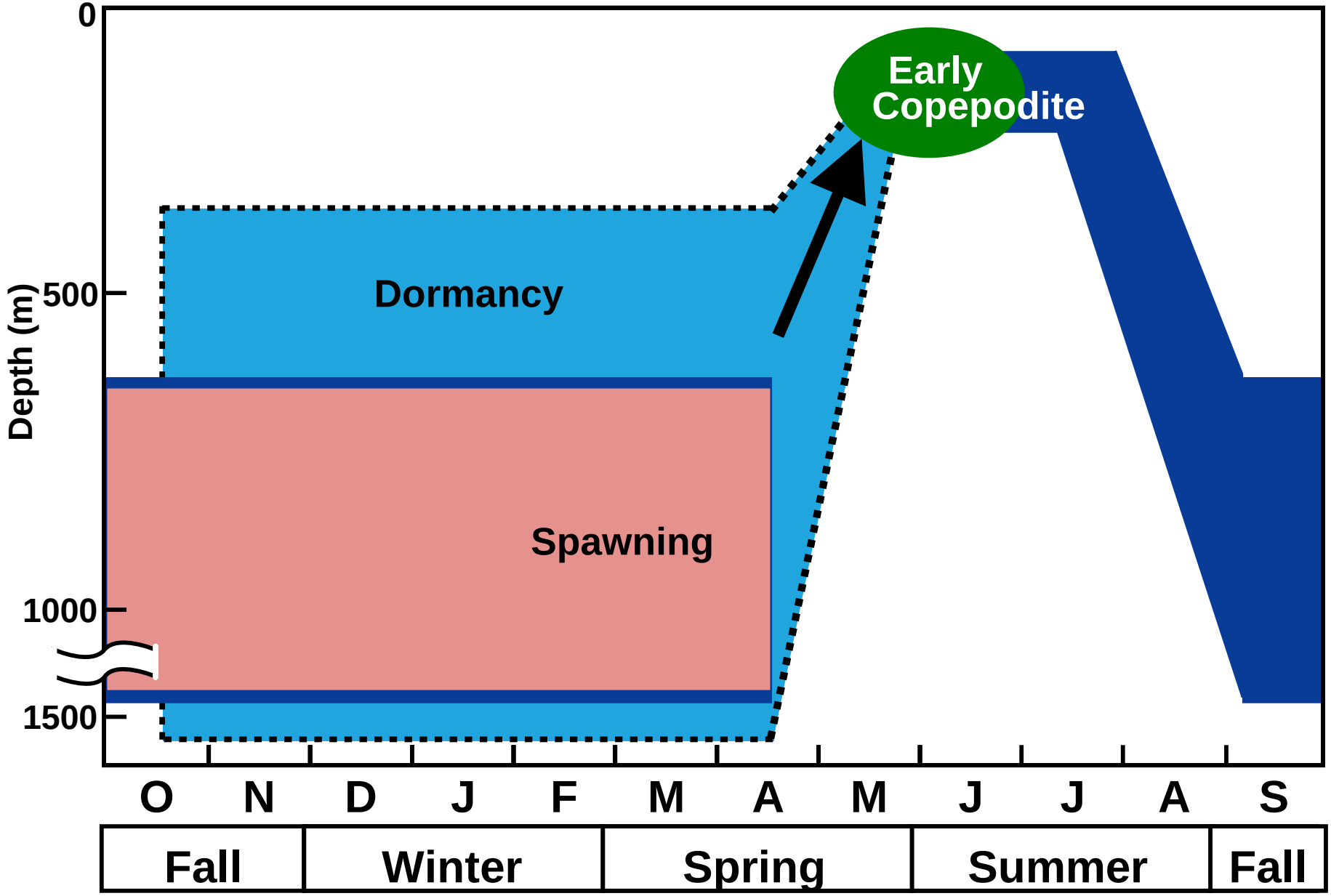


(Tsuda et al. 1999; Kobari and Ikeda 2001a)

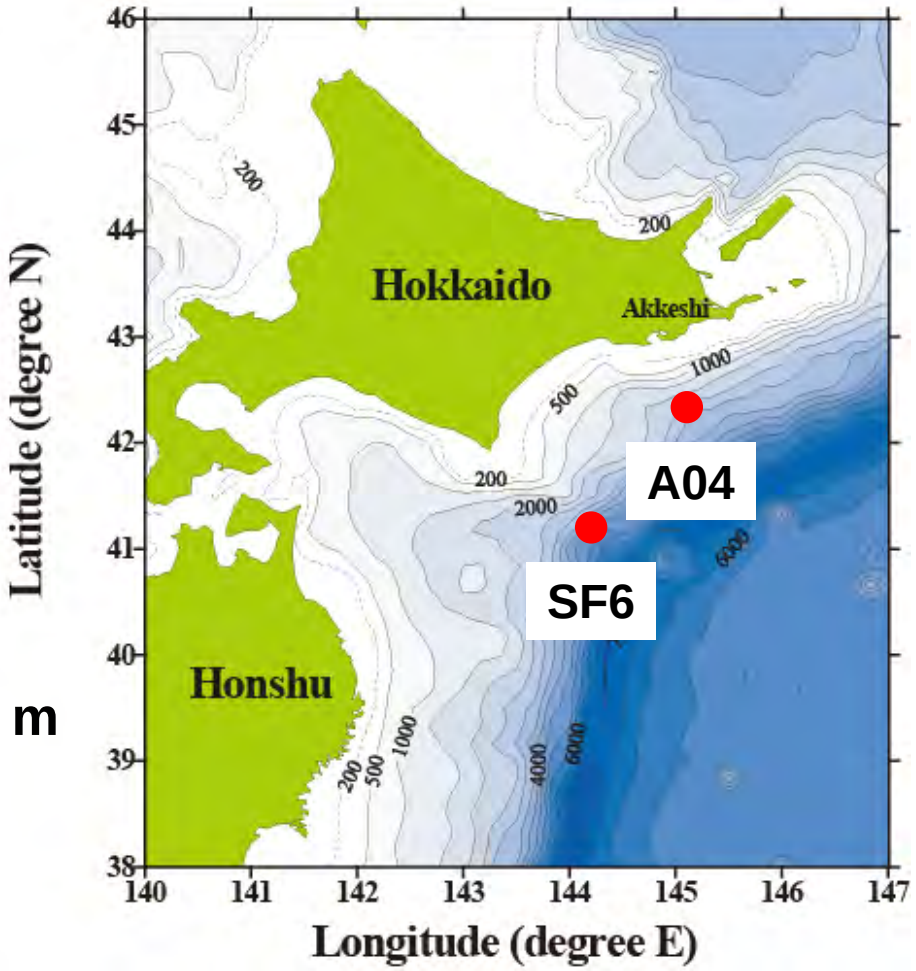
Main Goal

Investigate vertical distribution and seasonal migration of *Neocalanus* nauplii, and reveal early life history of *N. flemingeri* , *N. cristatus* and *N. plumchrus.*

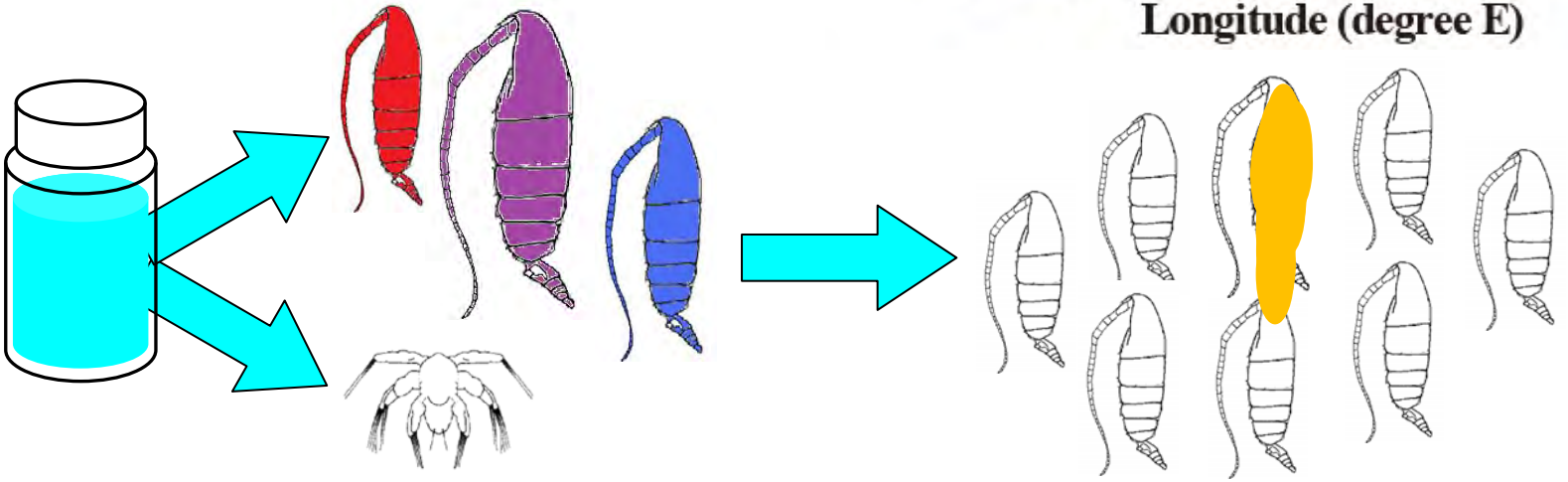
Materials and Methods

✓Sampling

- A04 (42º 15.0 N; 145º 07.5 E)
  SF6 (41º 17.0 N; 144º 24 E)
- Oct. 2009
  Jan., Mar., Apr., May, 2010
- VMPS, Closing Norpac net
  2000-1500-1000-500-200-100-50-20-0 m



✓Methods



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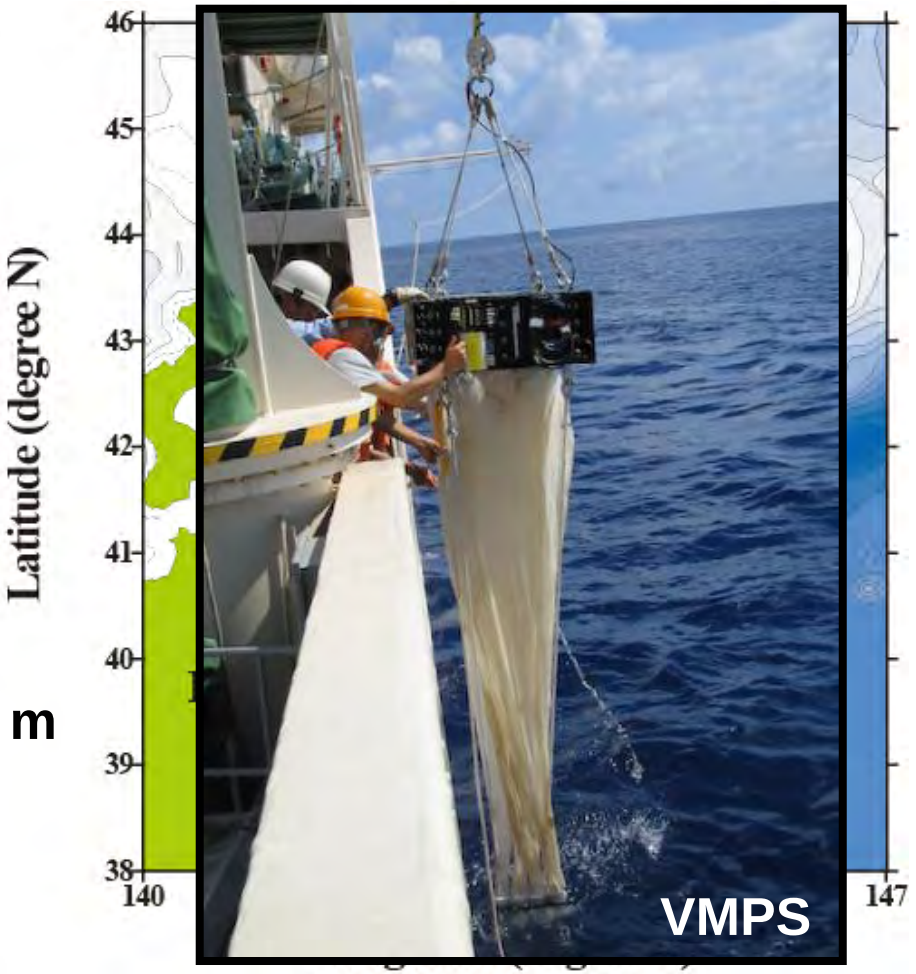

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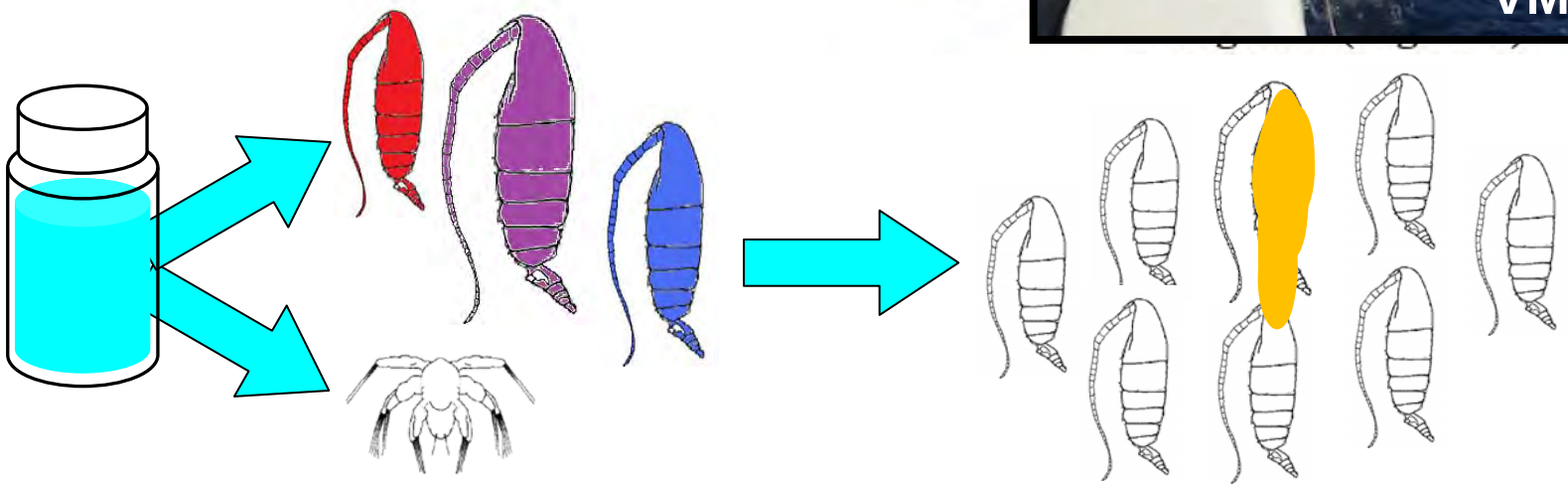

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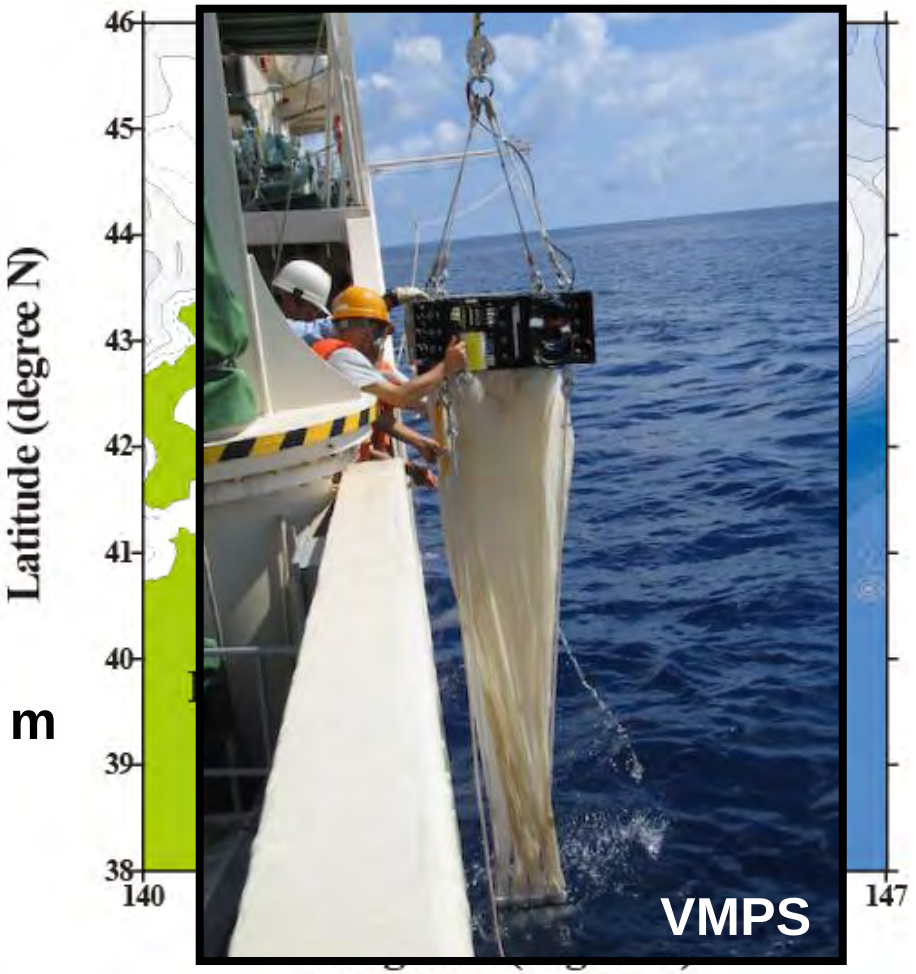

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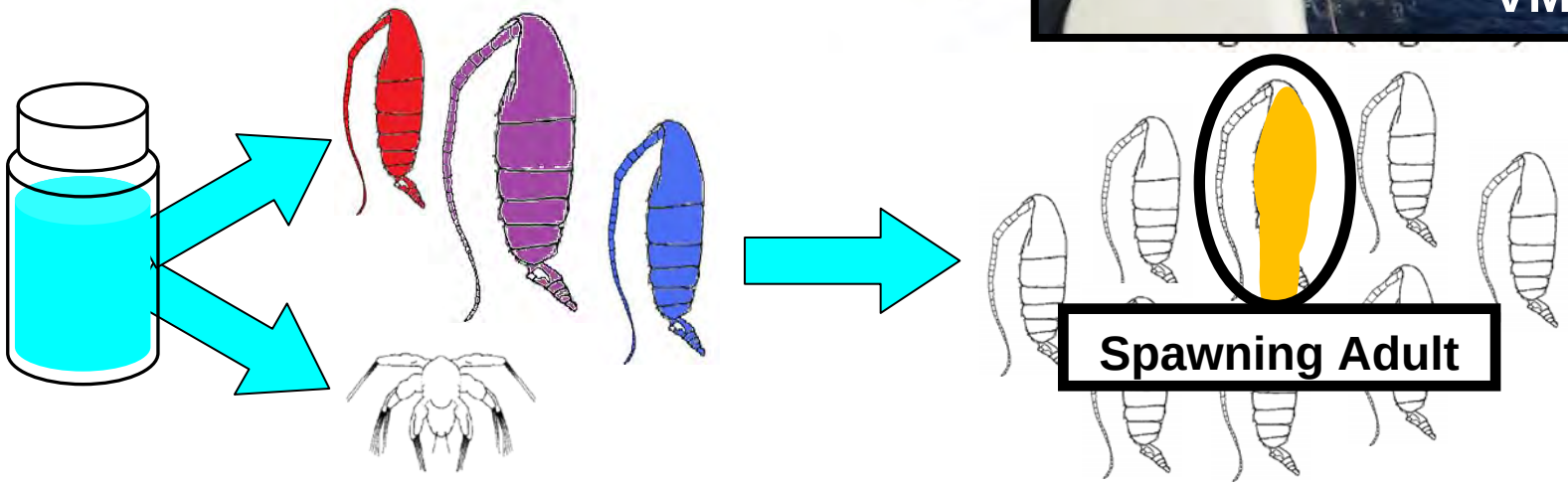
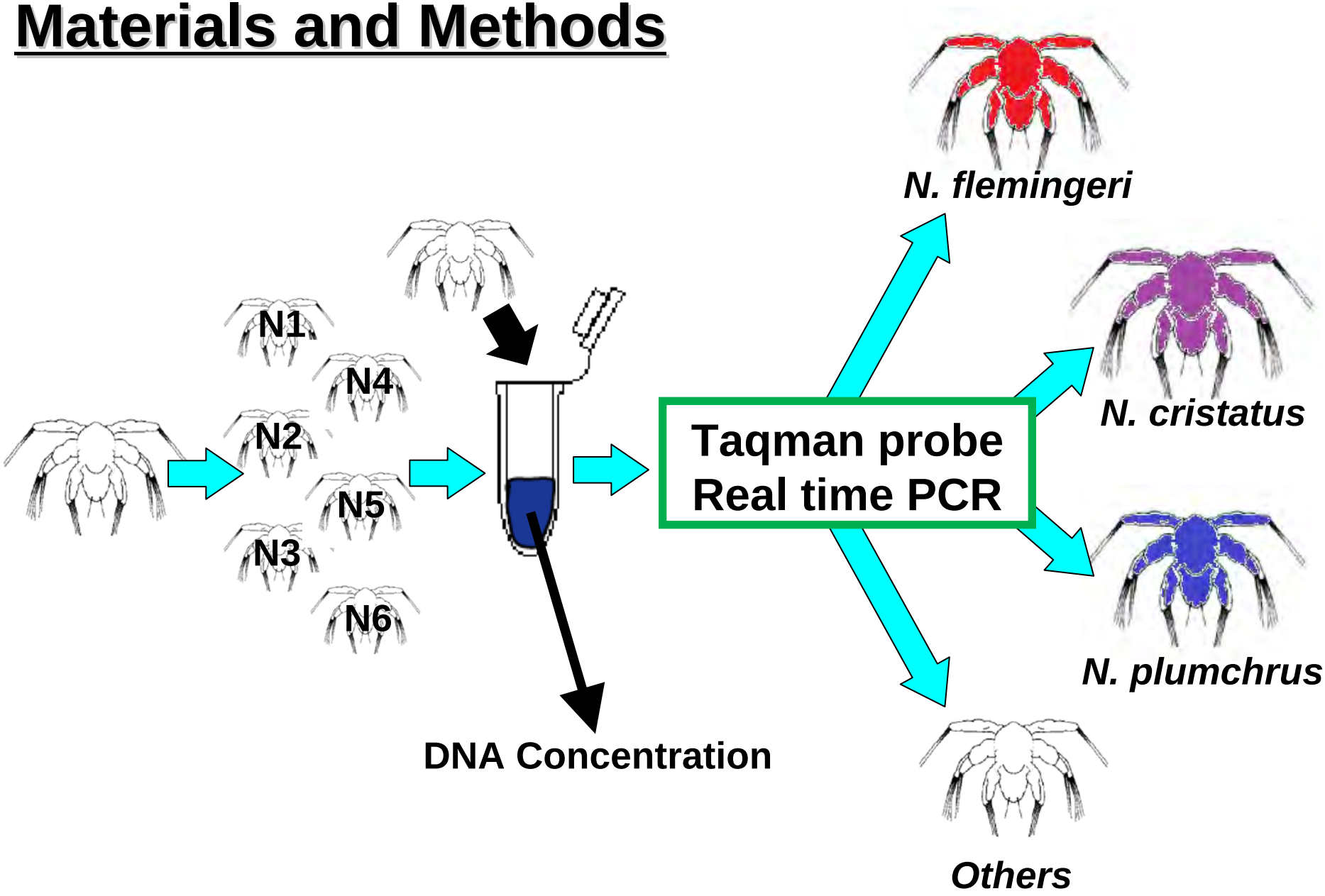
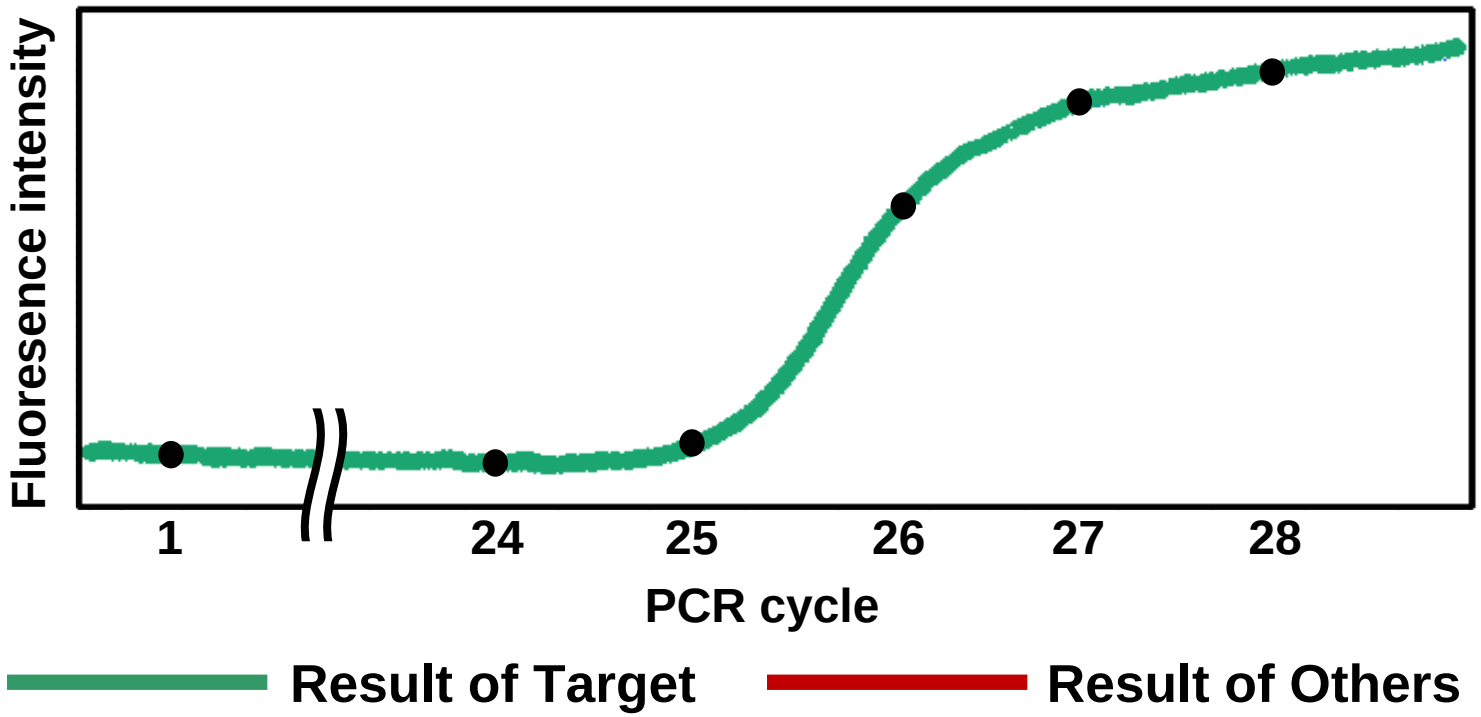


Materials and Methods



TaqMan probe Real-Time PCR



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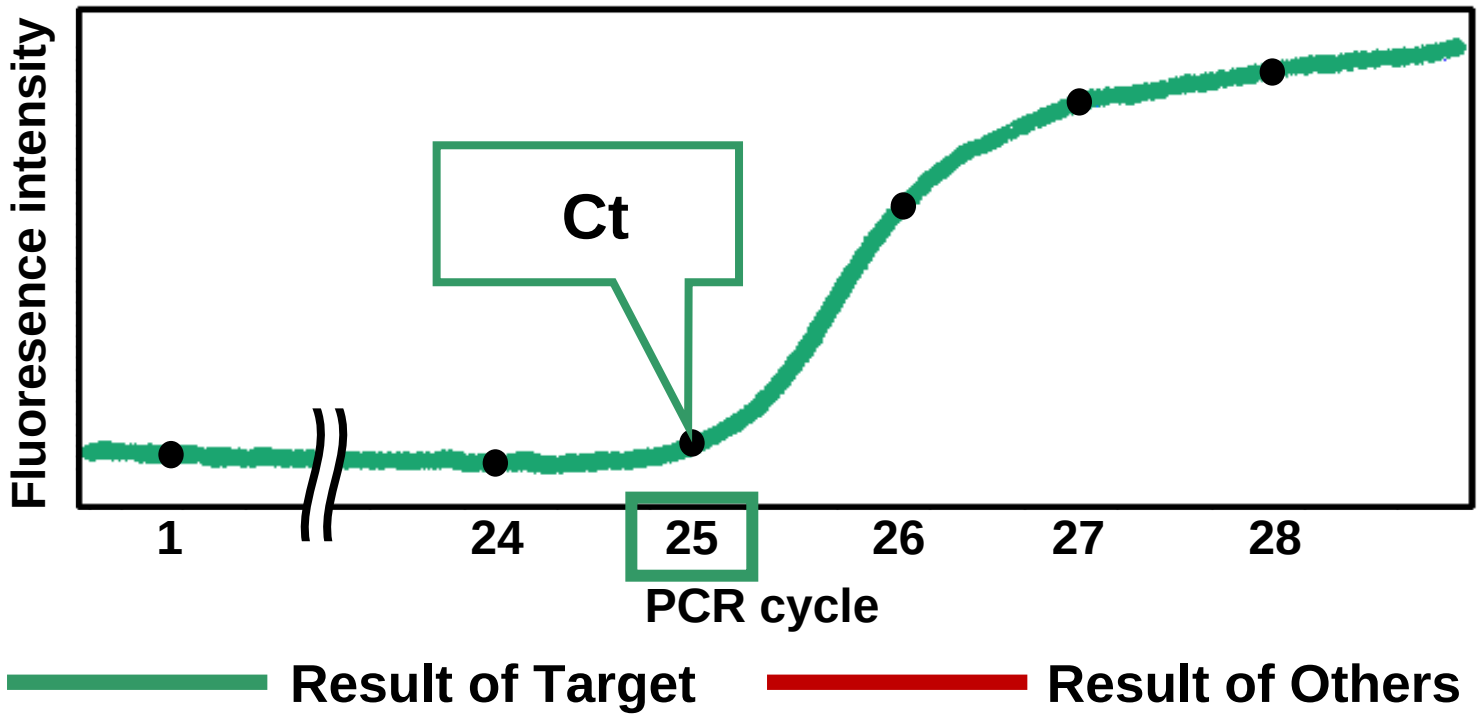

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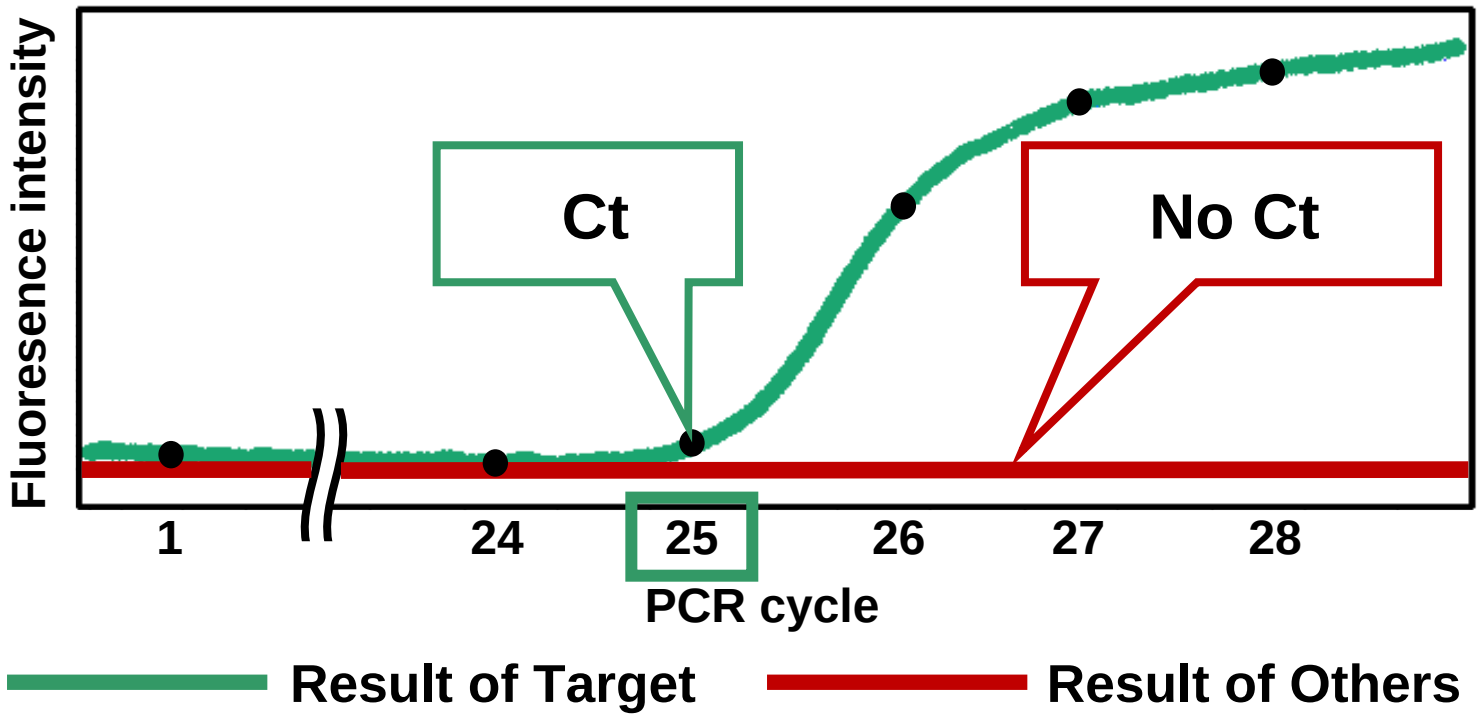

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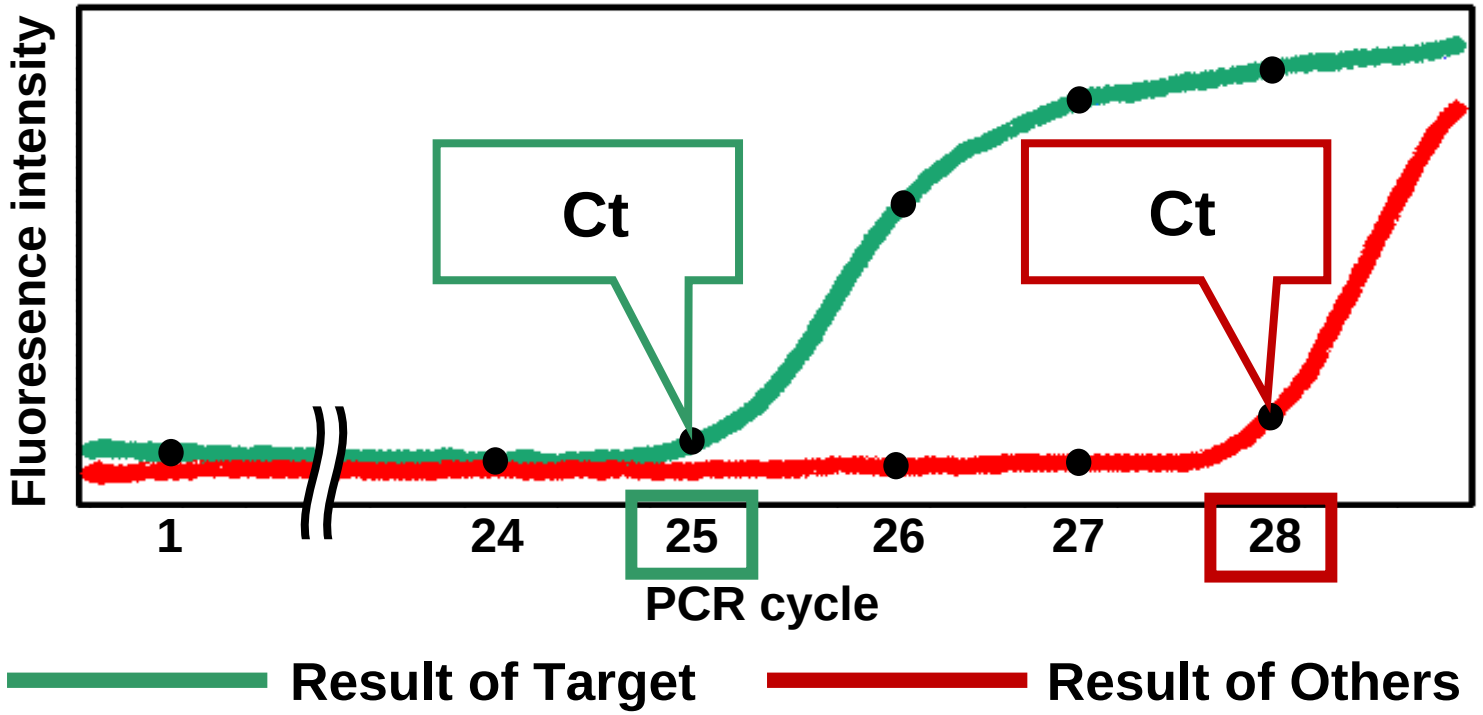
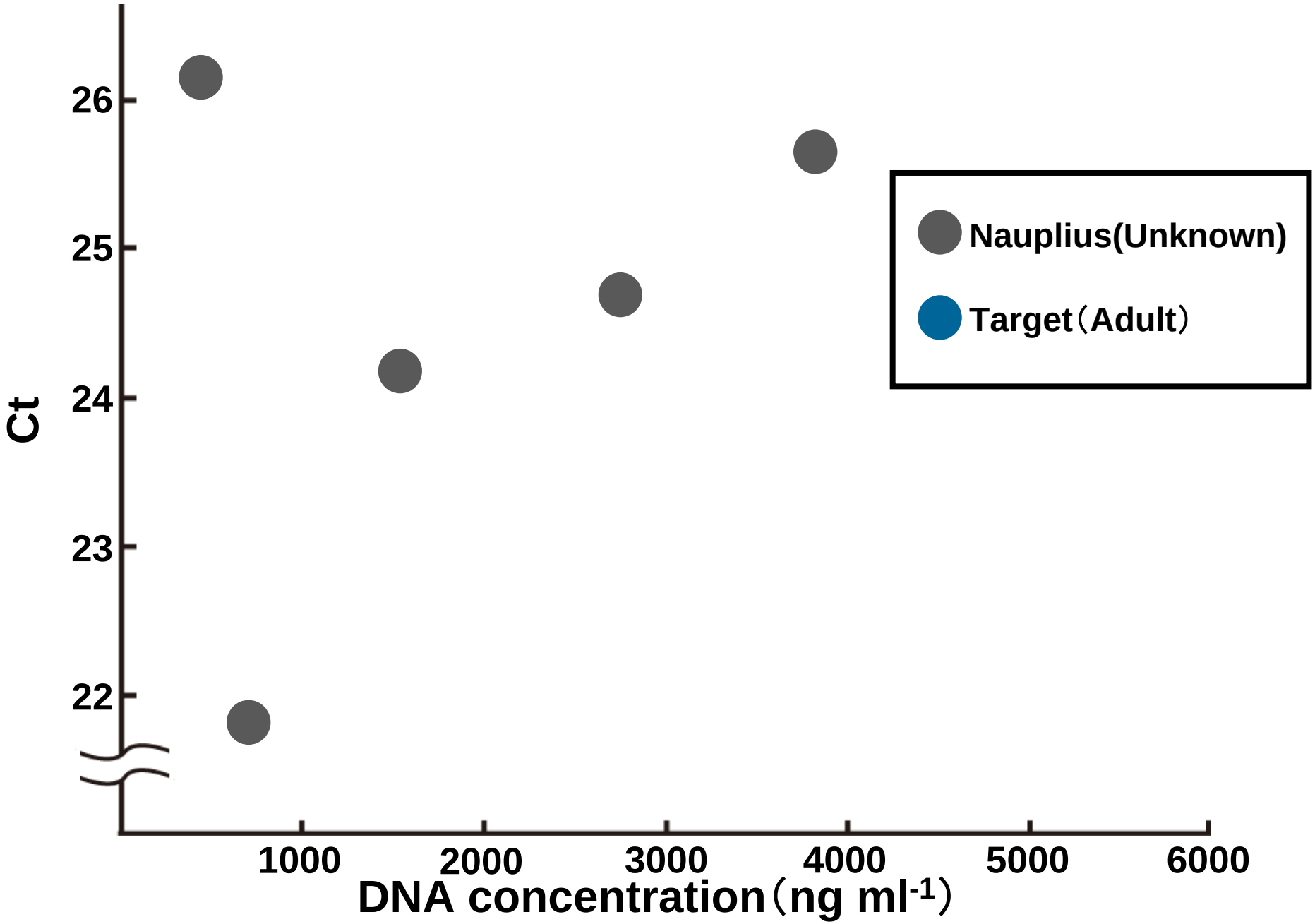


Used Ct value to identify target species

Identification method



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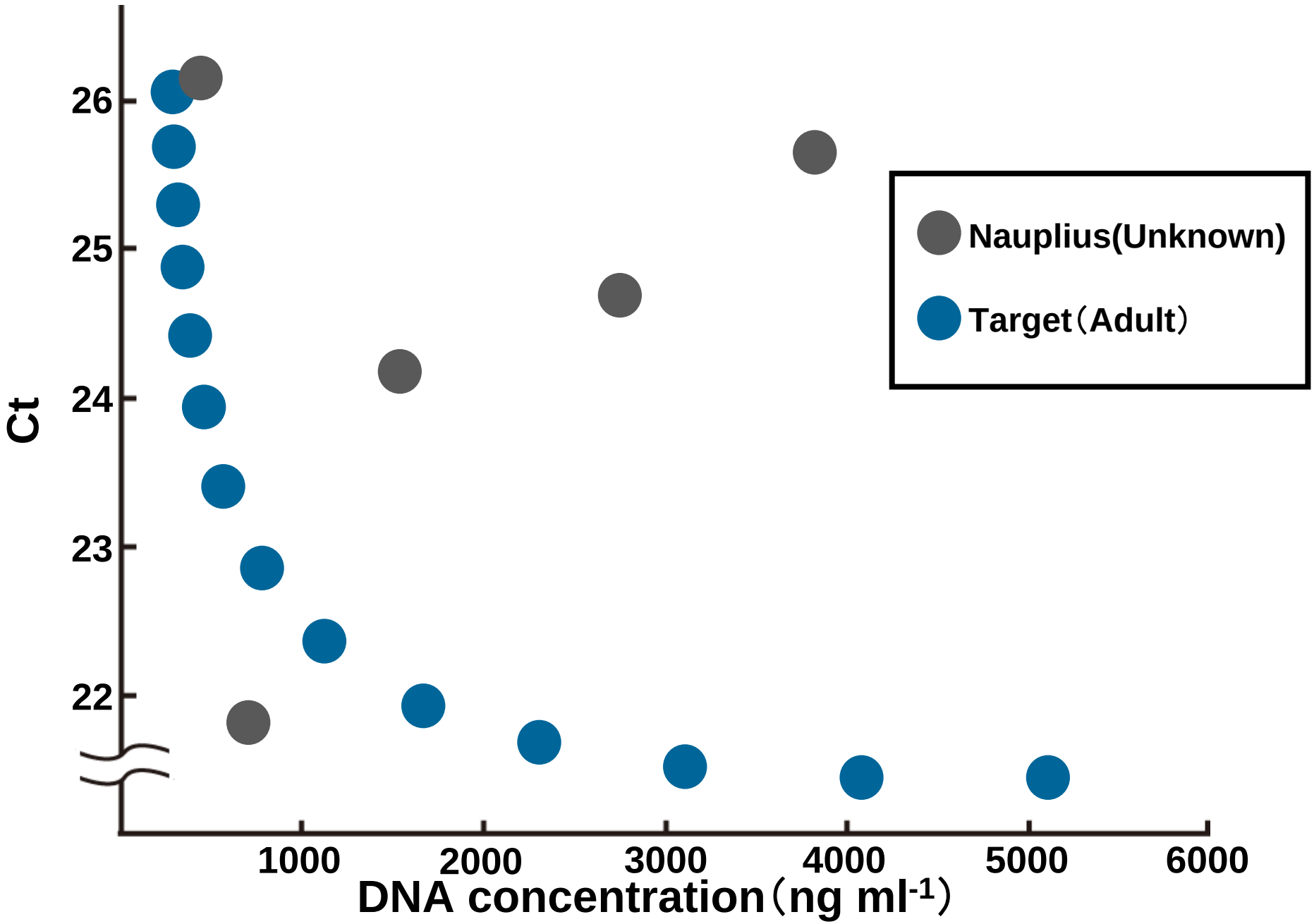

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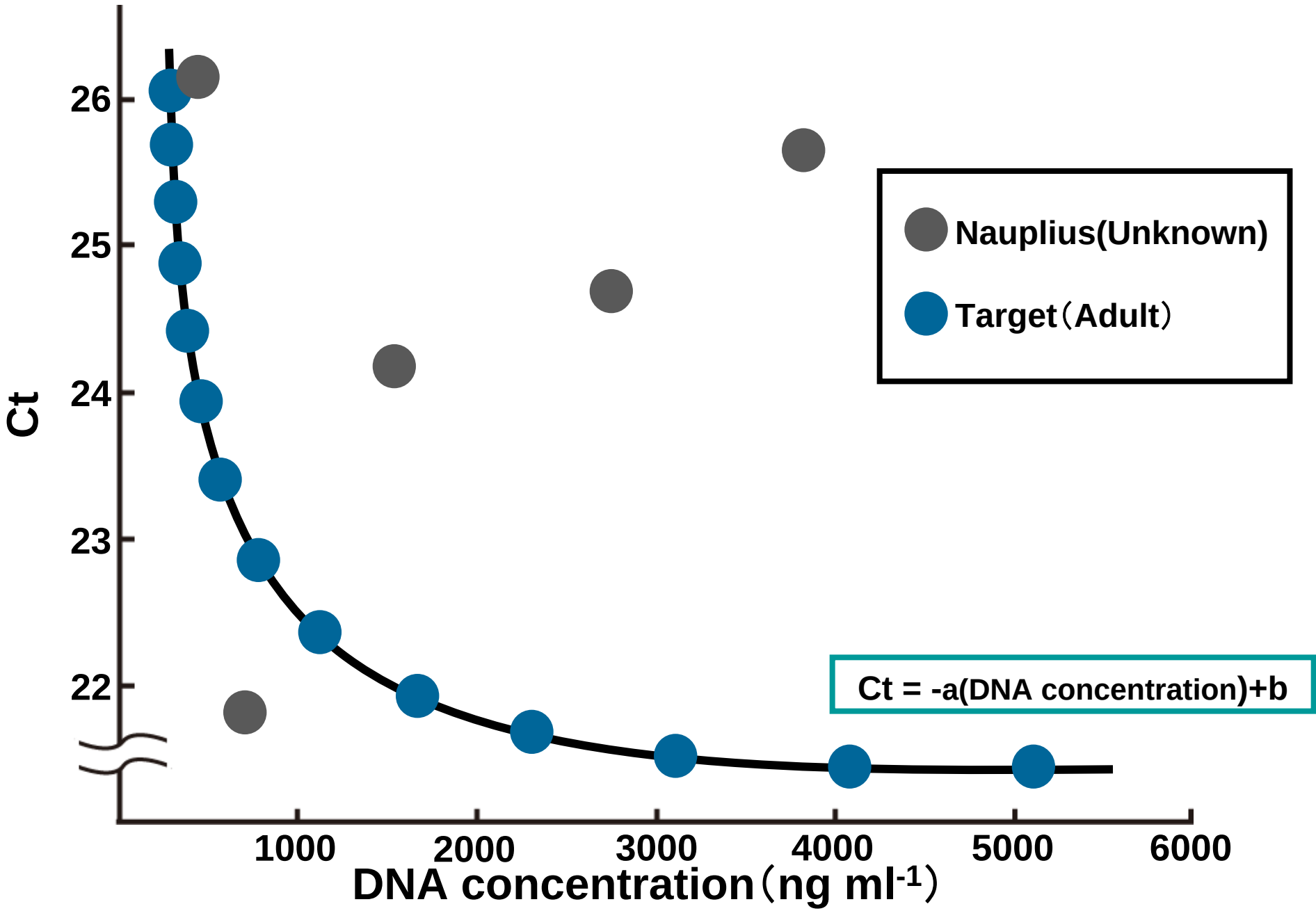

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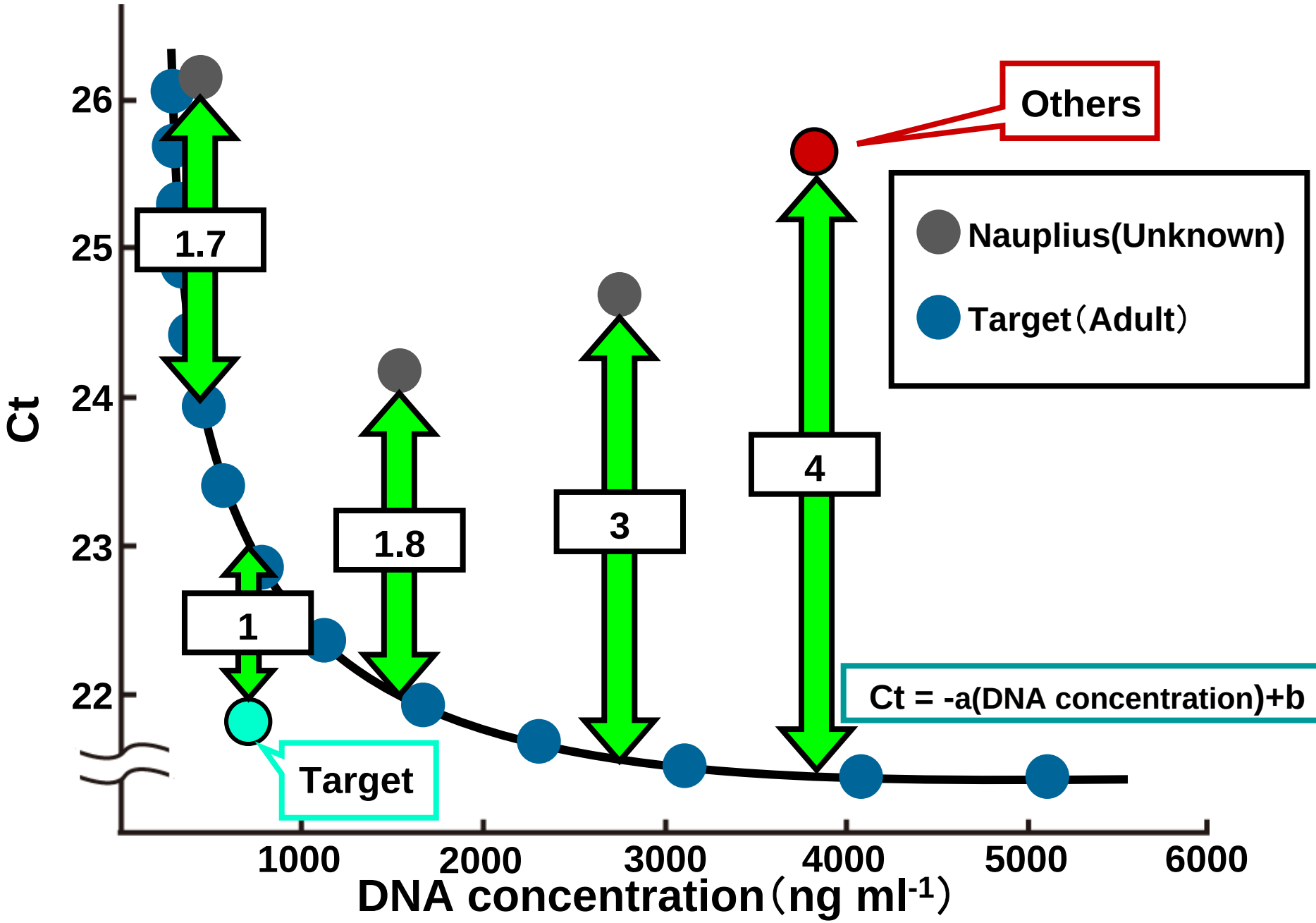

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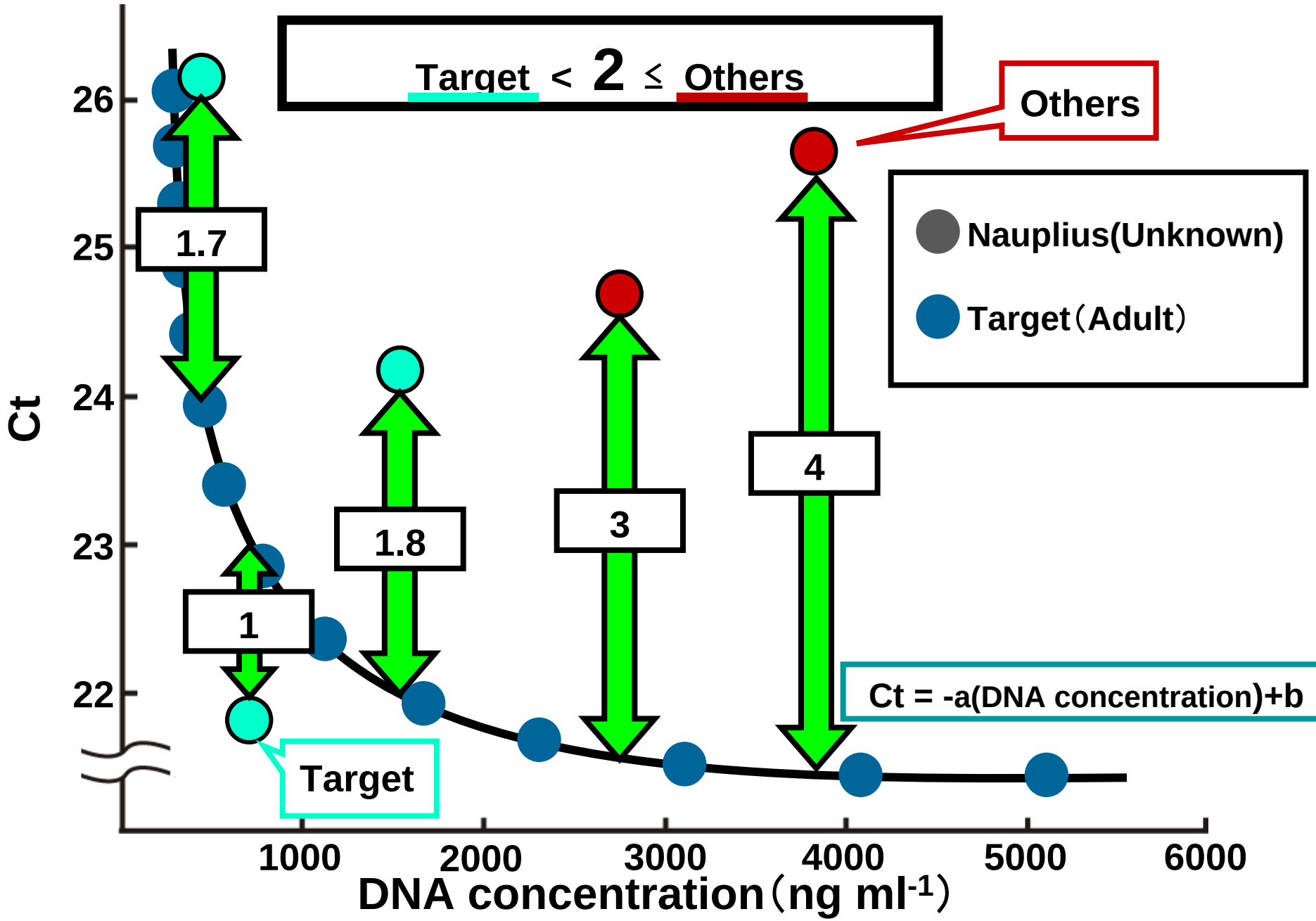


Using the Real time PCR method

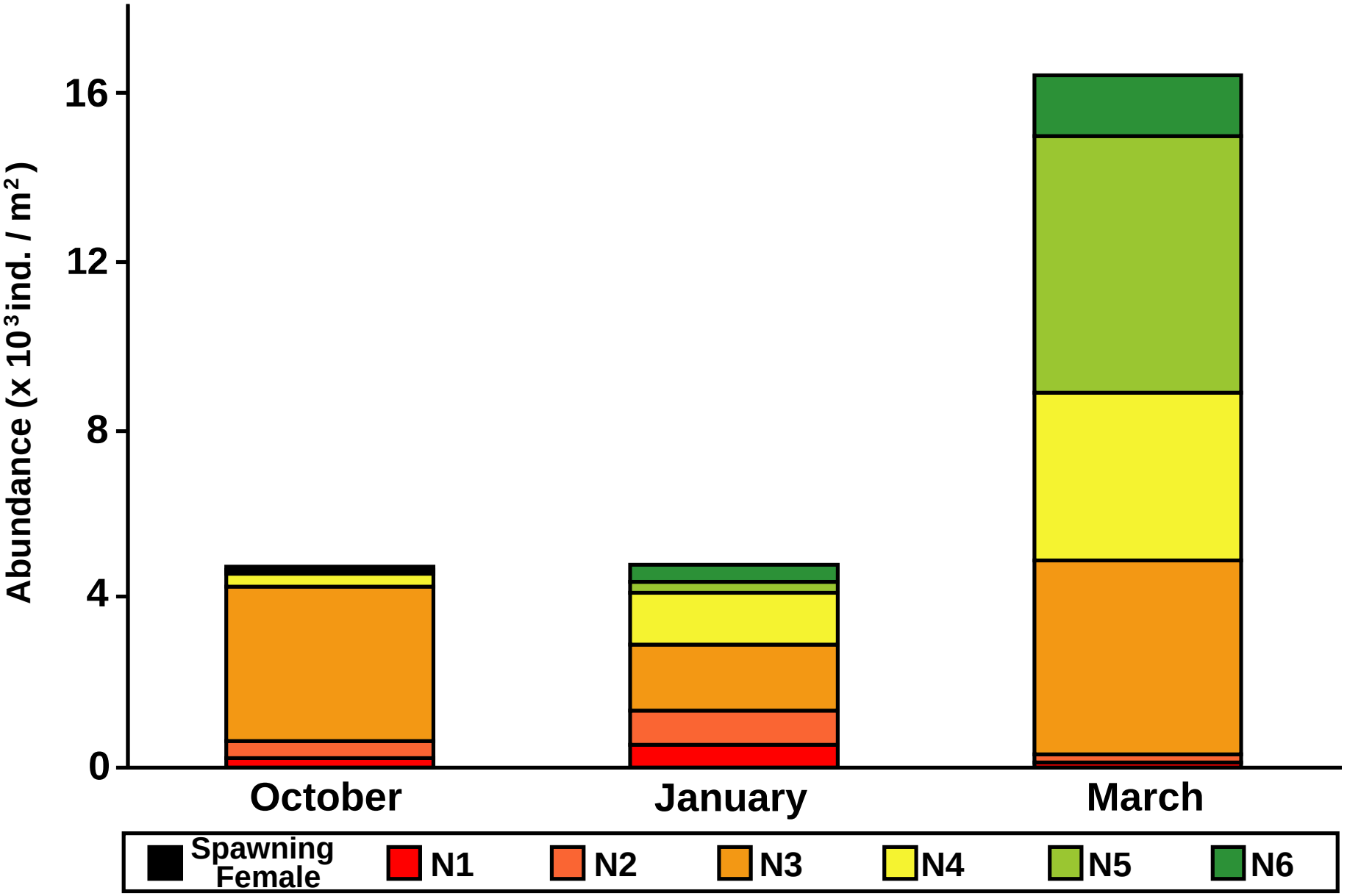
- ***N. flemingeri*** **: Oct., Jan. and Mar.**
- ***N. cristatus*** **: Oct., Jan., Mar., Apr. and May**
- ***N. plumchrus*** **: Oct., Jan., Mar., Apr. and May**

From identification results

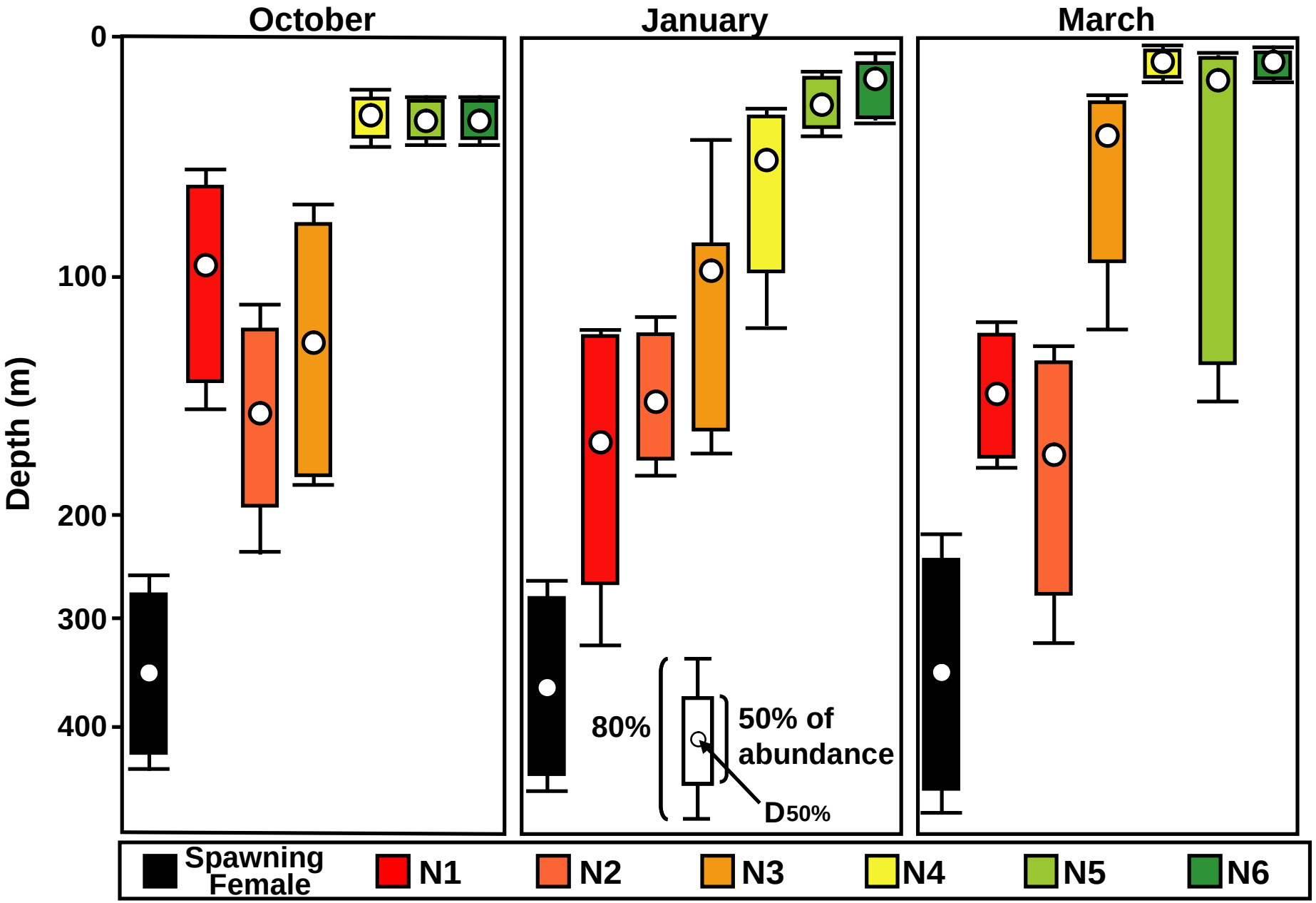
Seasonal changes of standing stock and vertical distribution

Reveal the early life history

Standing stock of *N. flemingeri*



Vertical distribution of *N. flemingeri*



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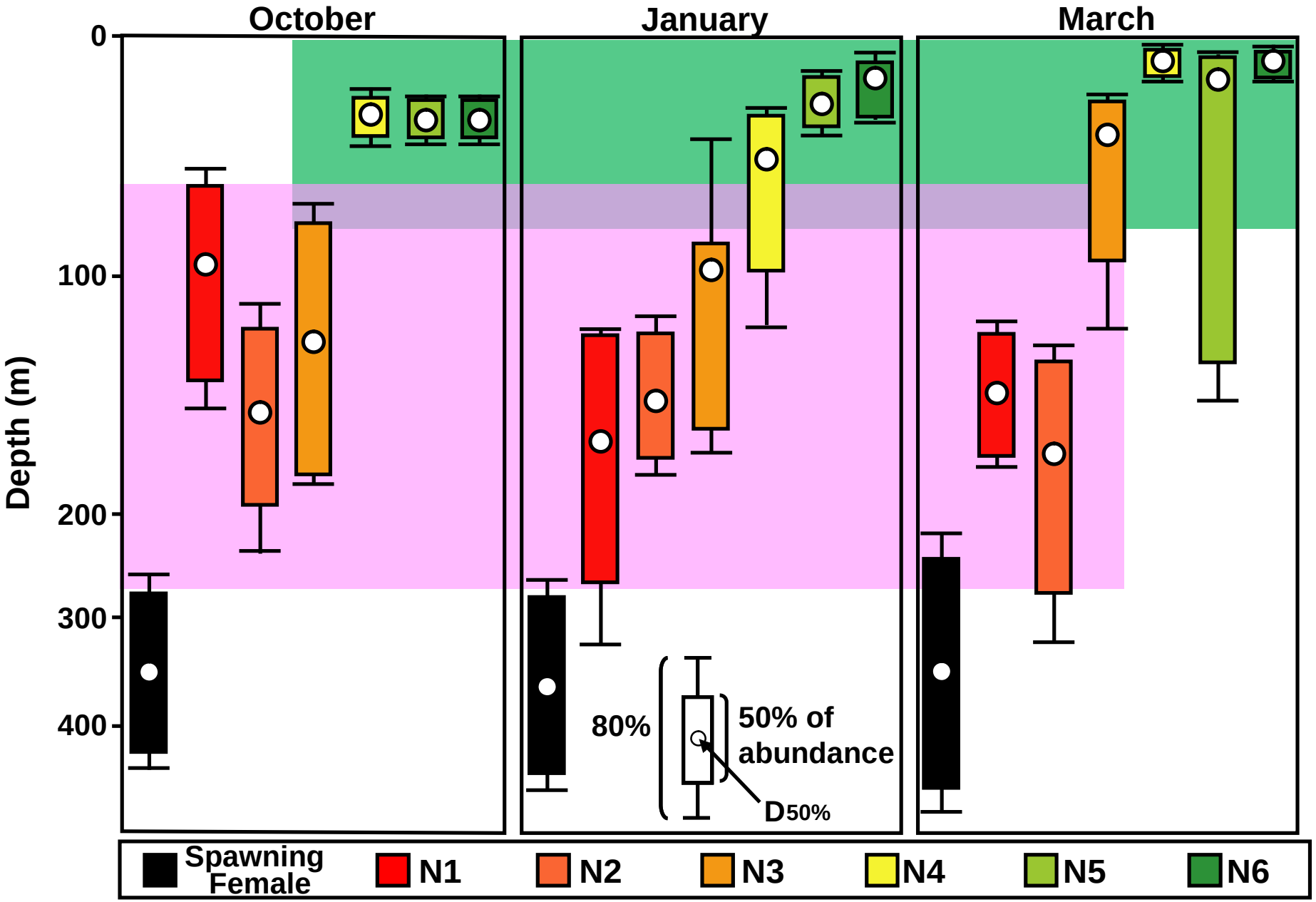
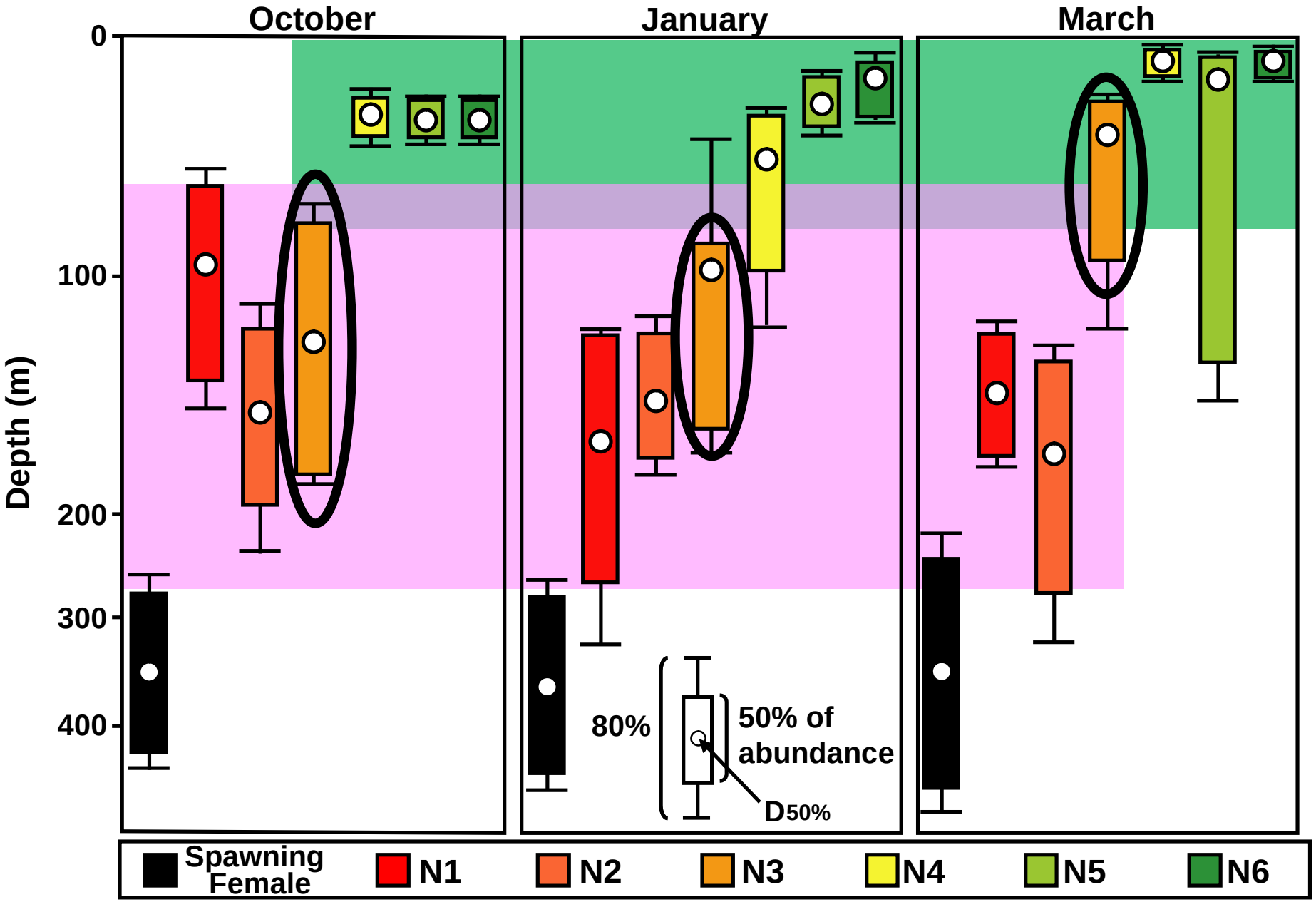
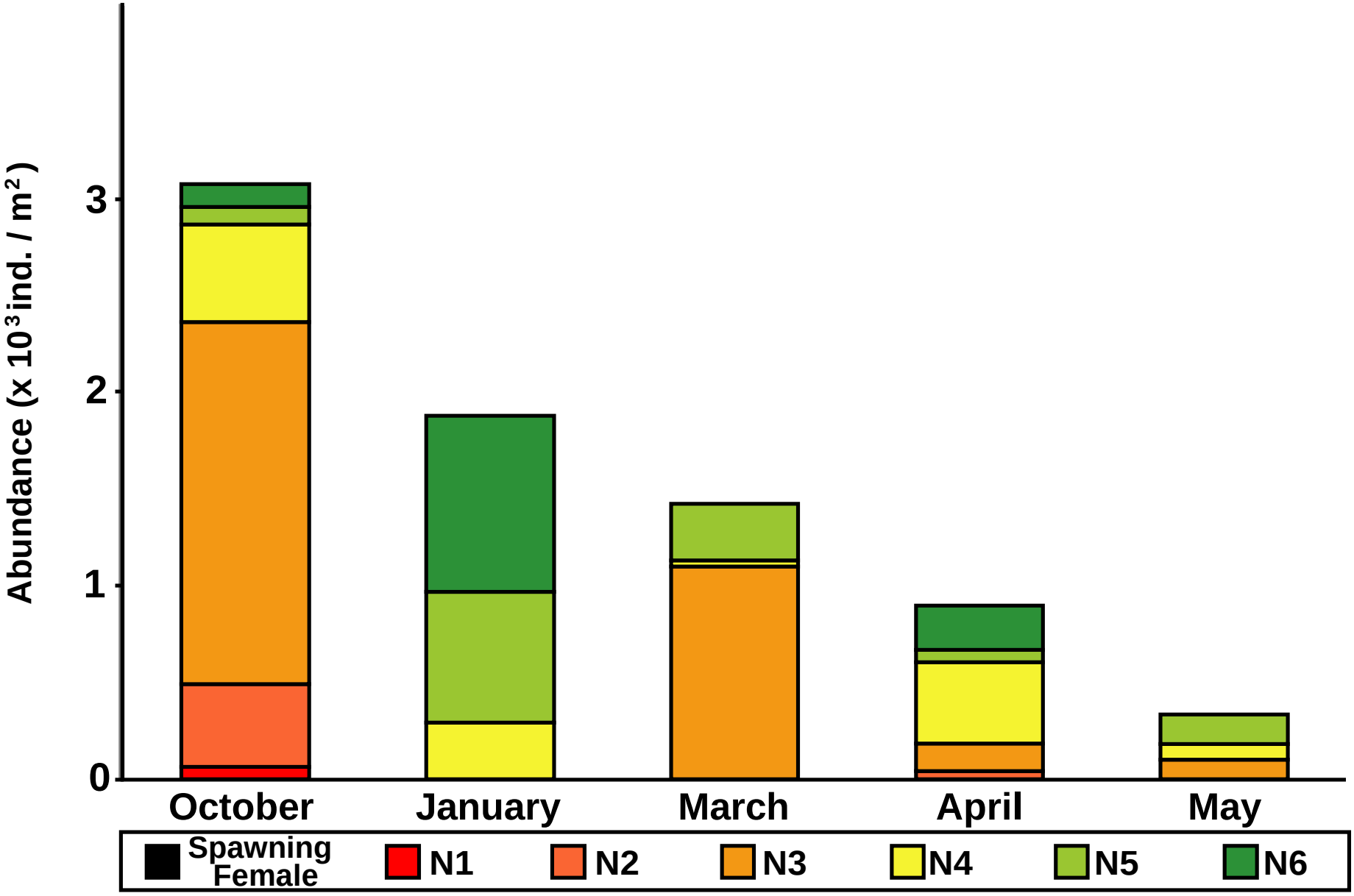


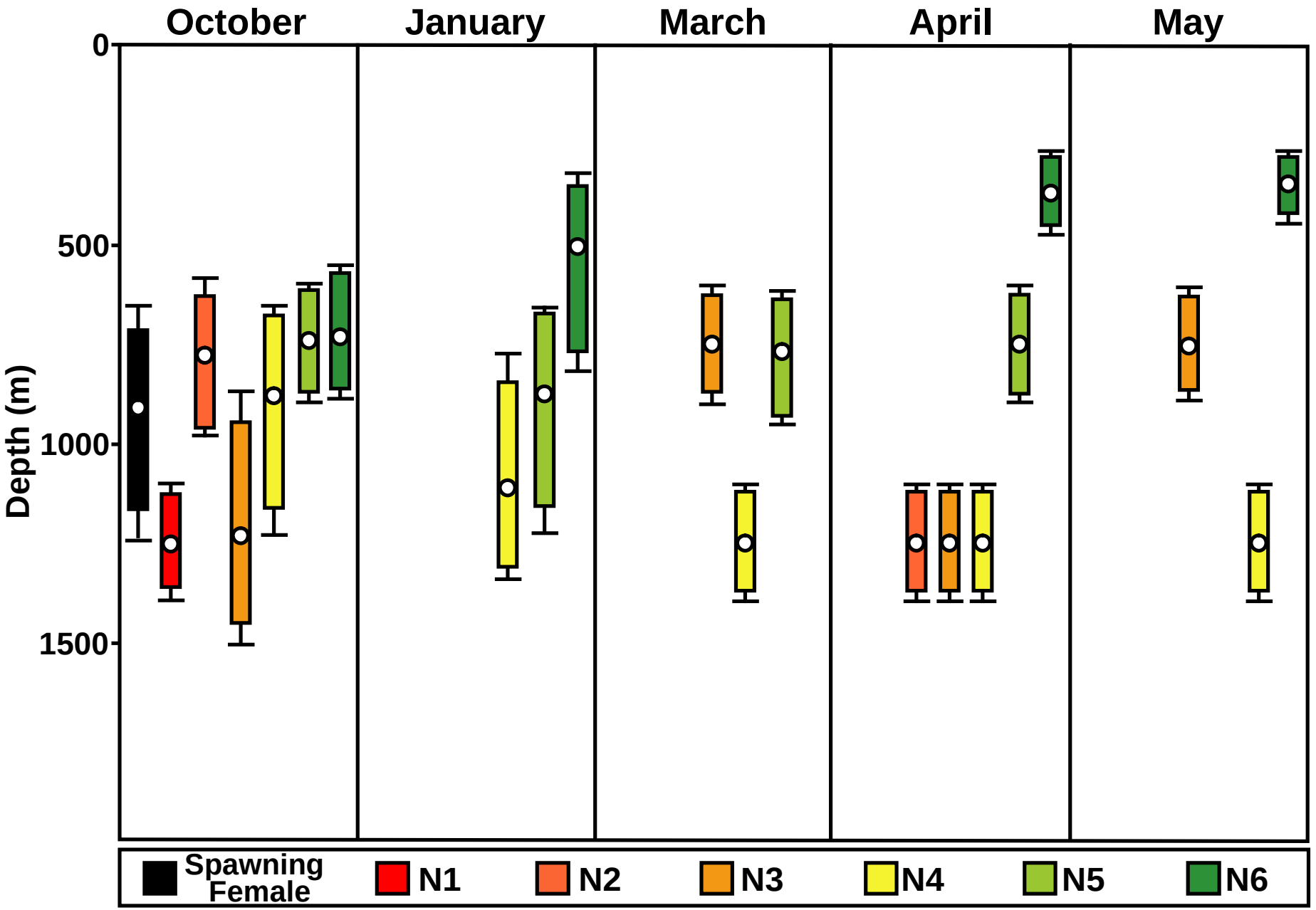
Vertical distribution of *N. flemingeri*



Standing stock of *N. cristatus*



Vertical distribution of *N. cristatus*



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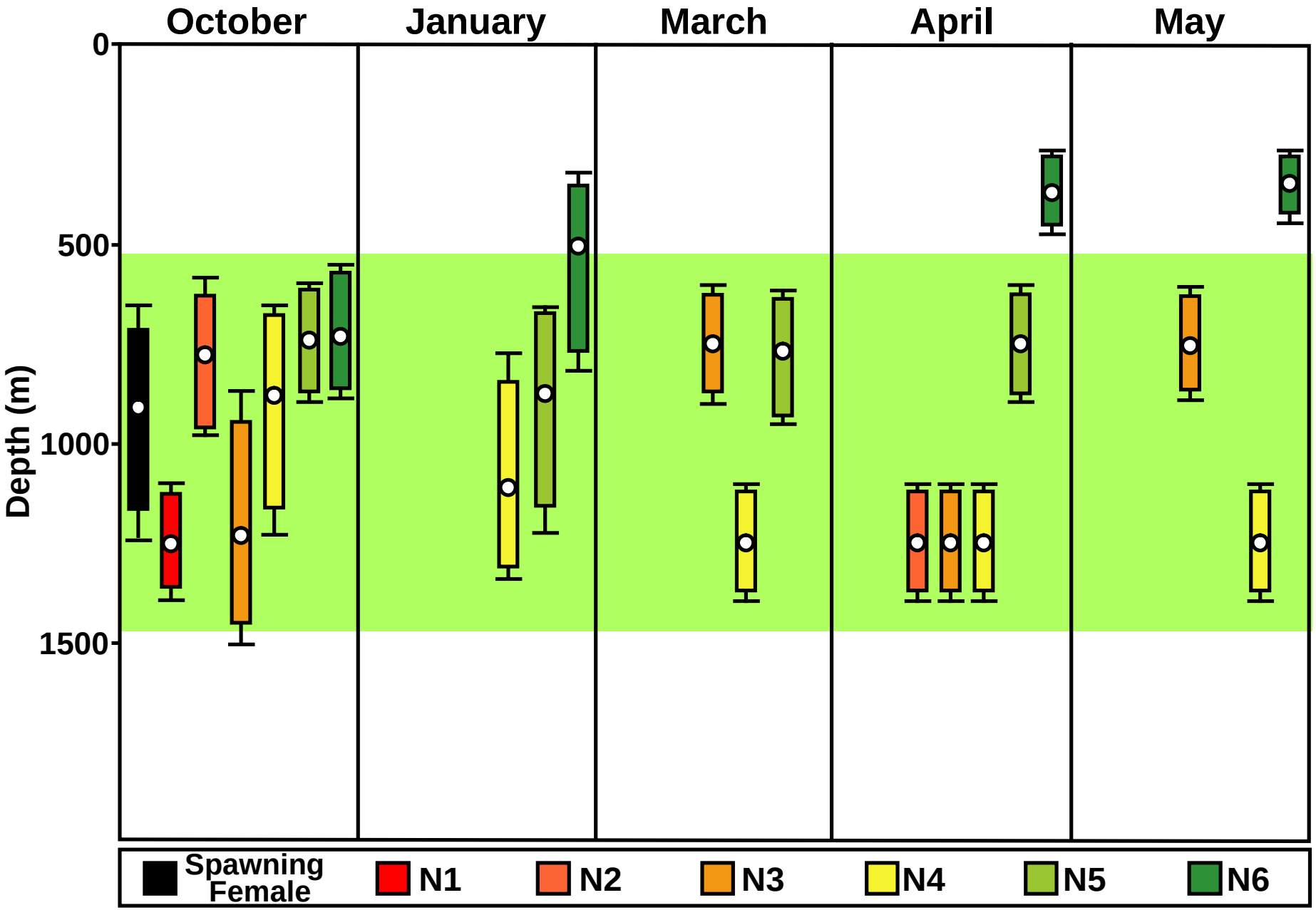

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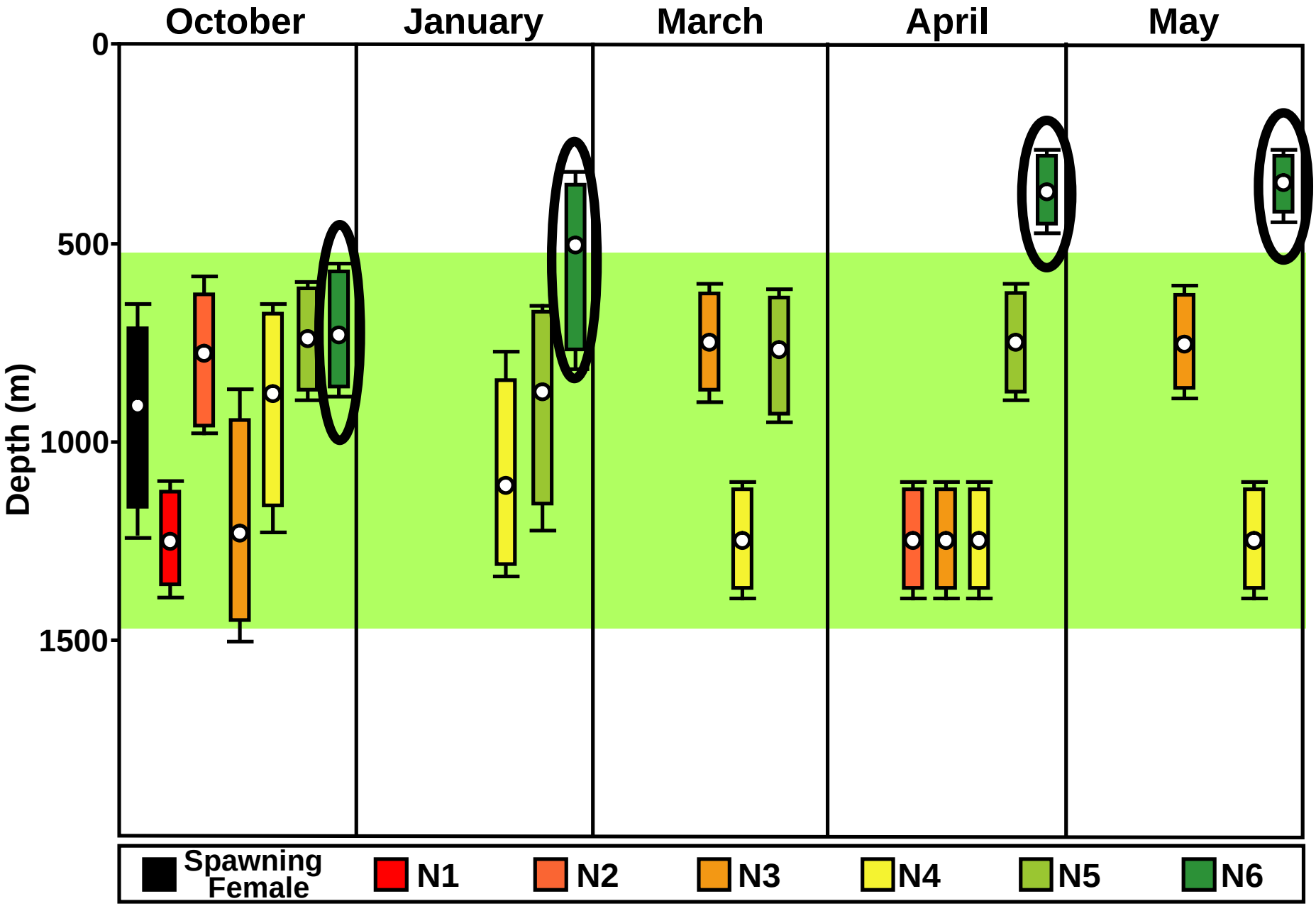
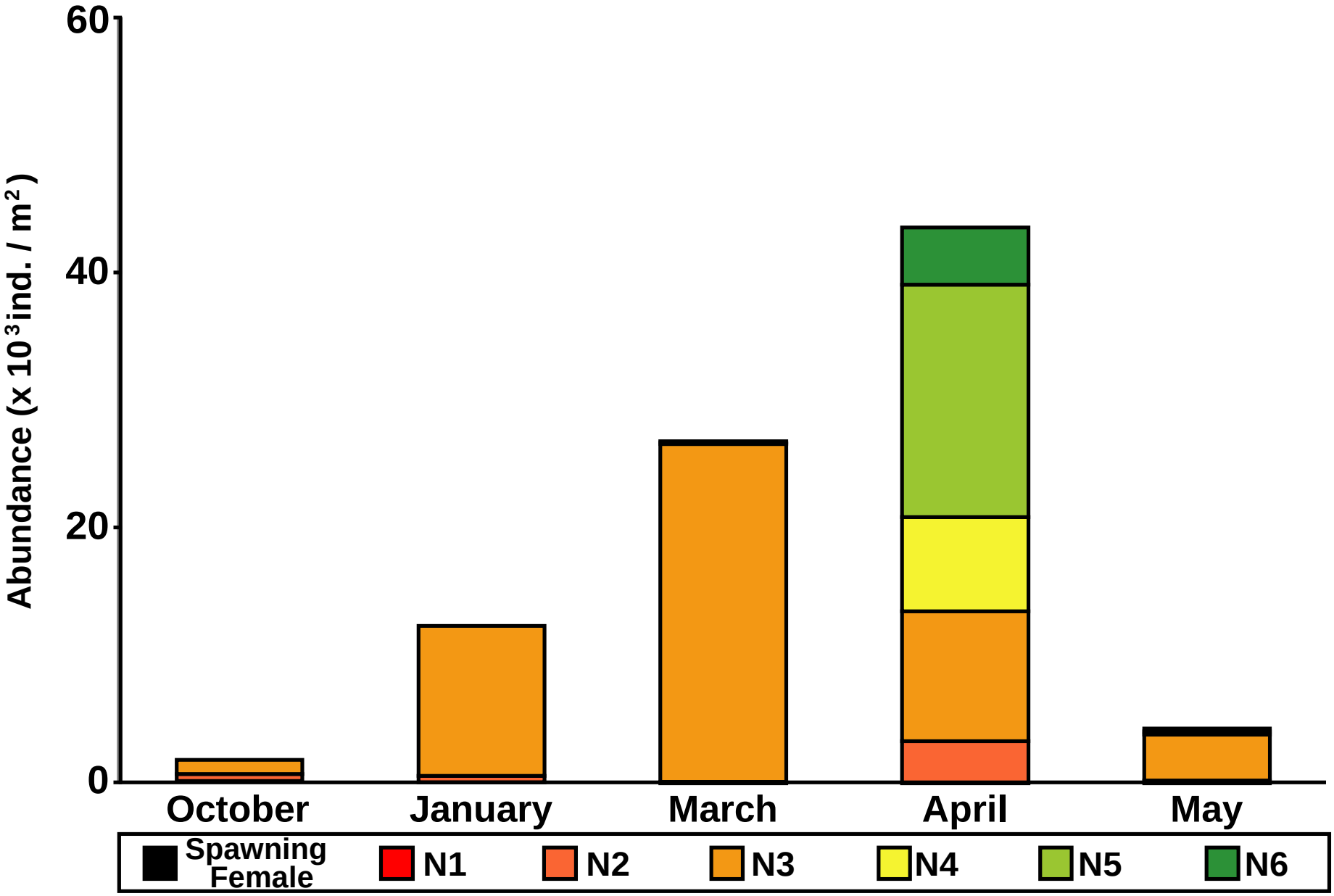


Standing stock of *N. plumchrus*



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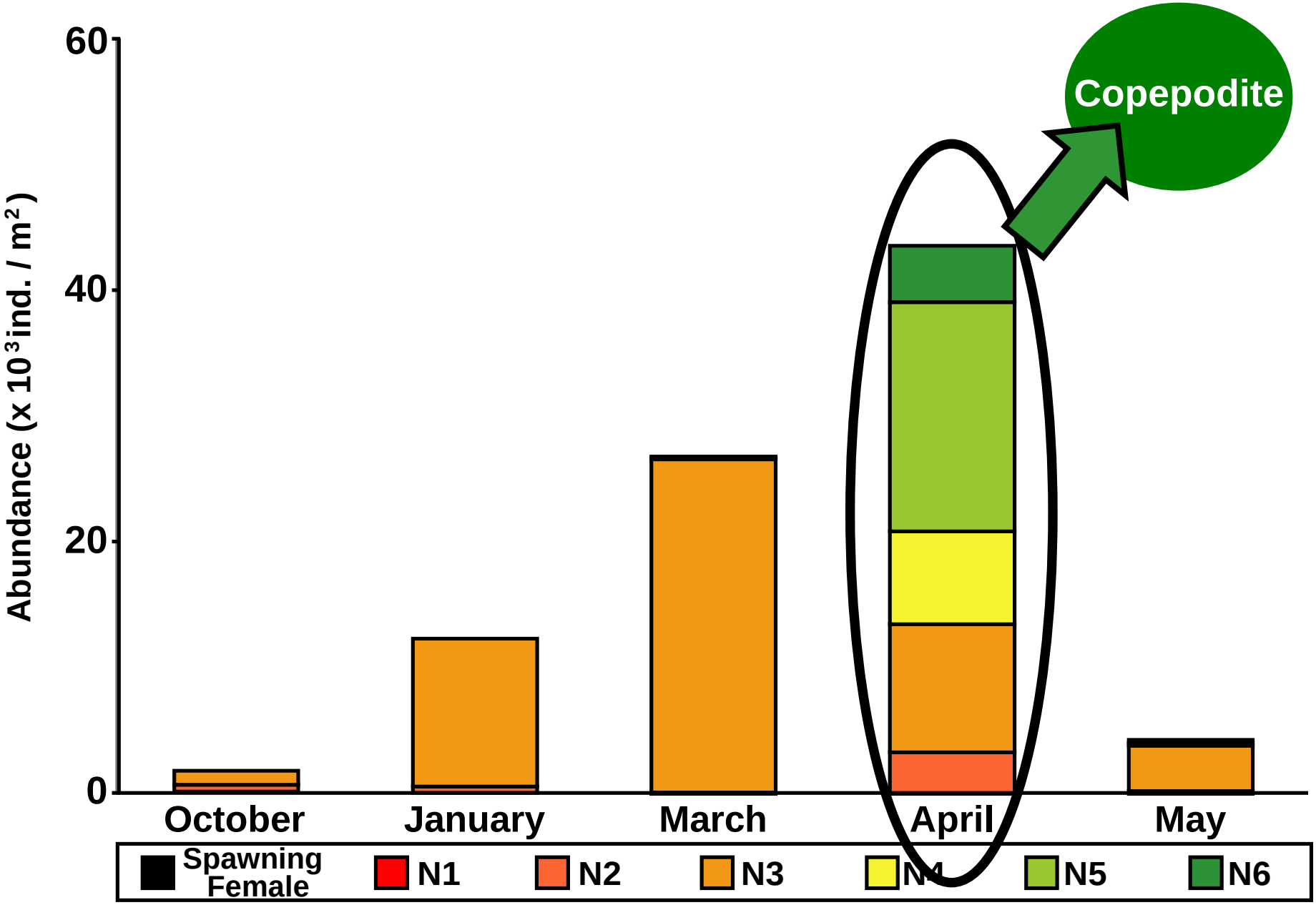

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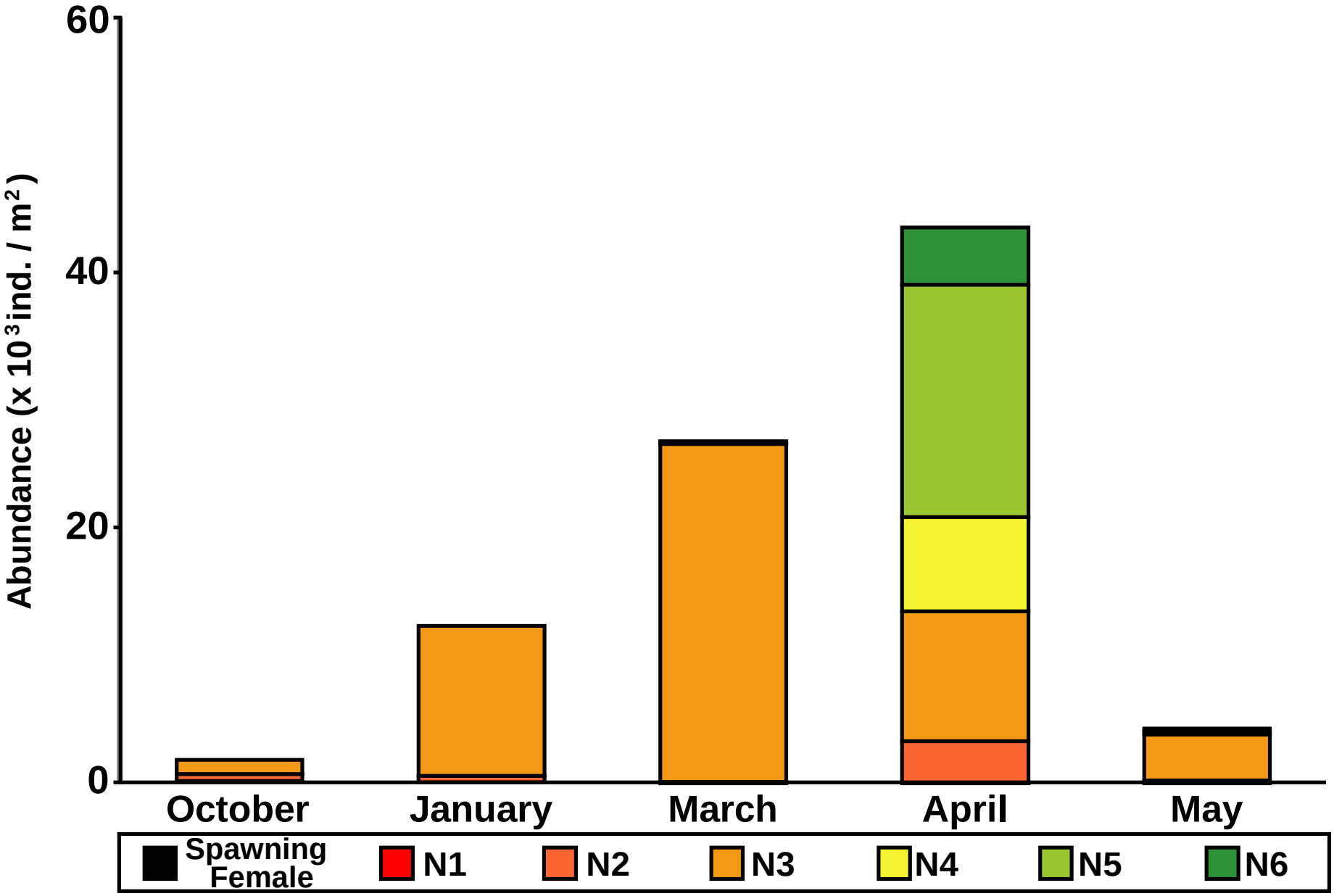

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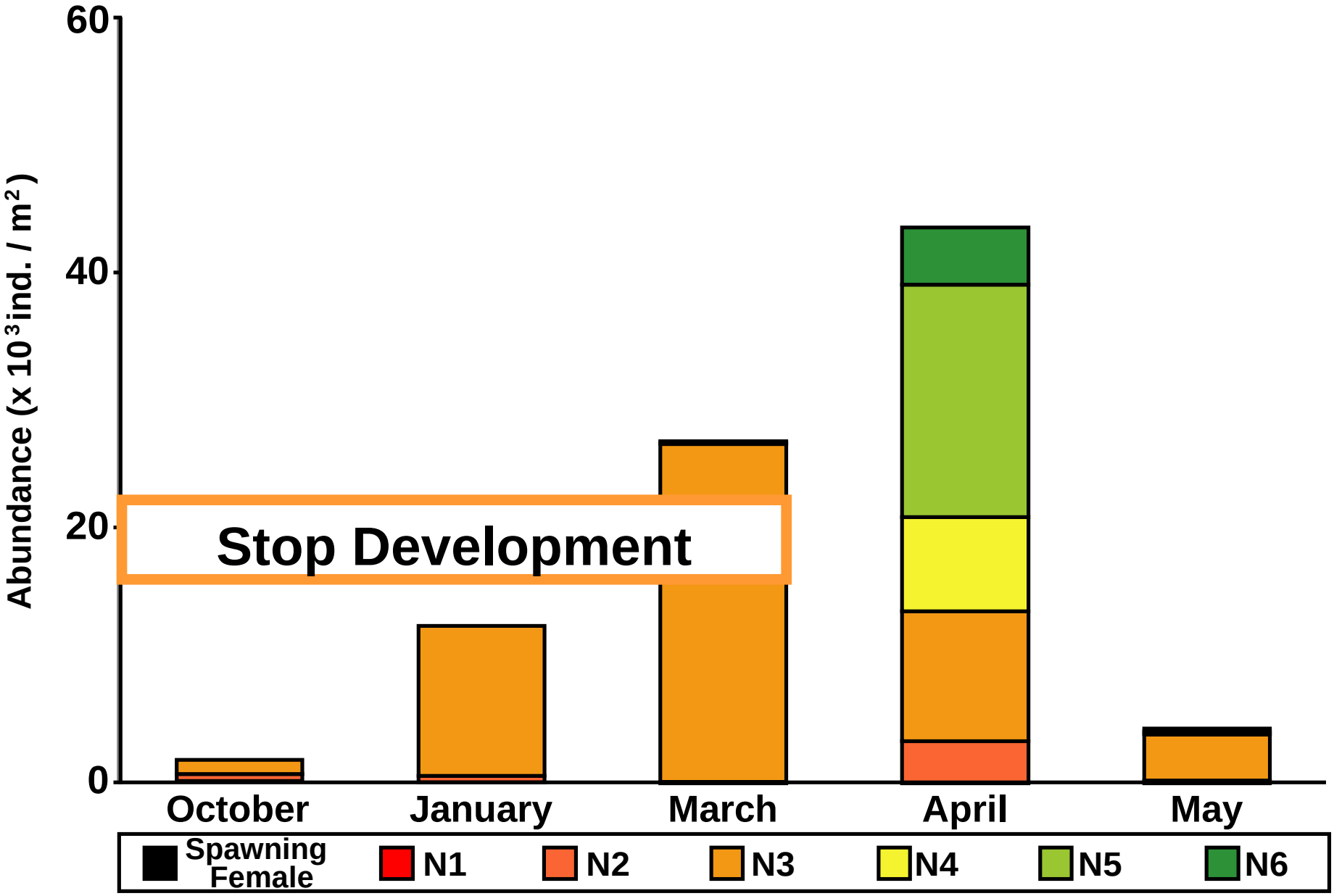

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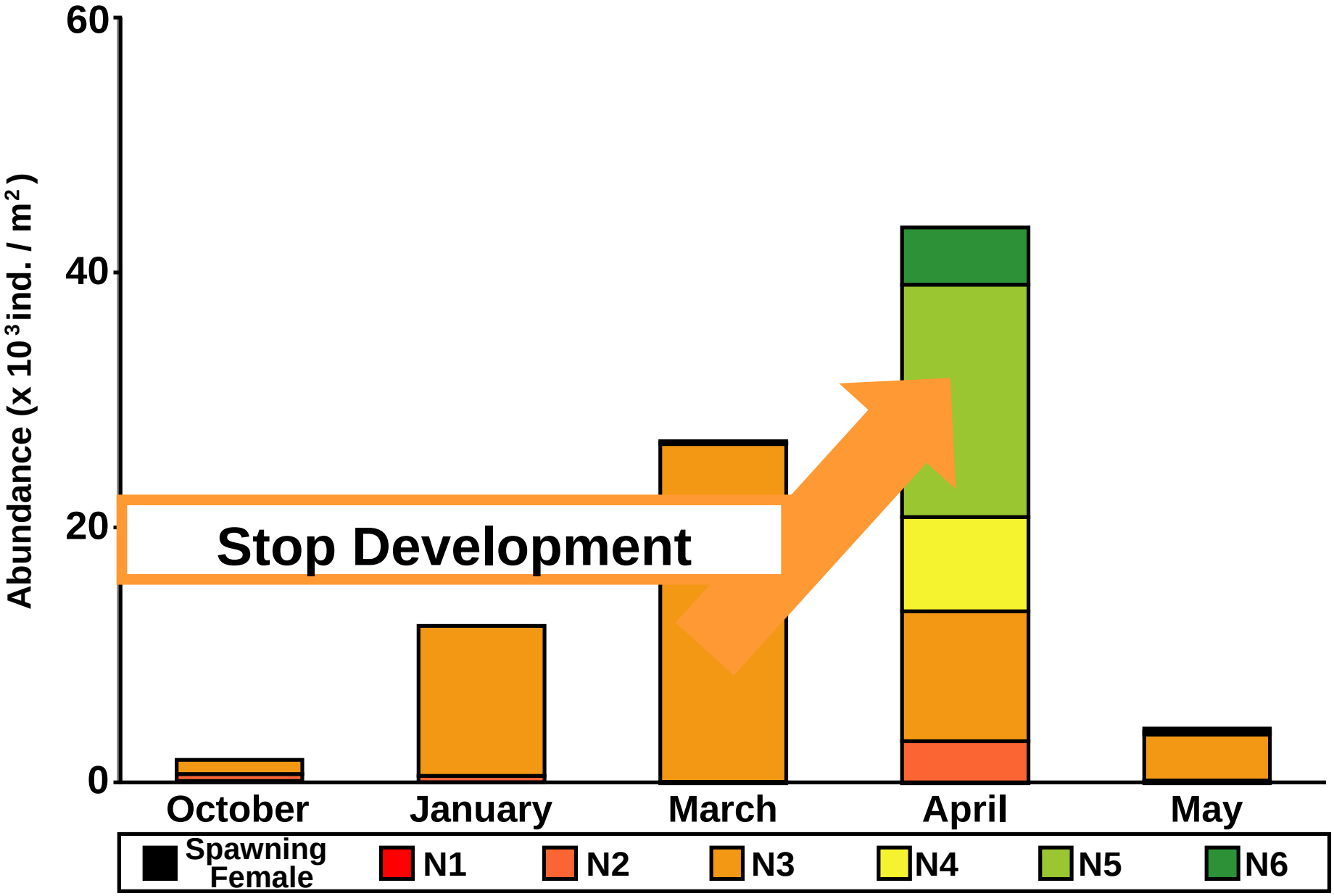

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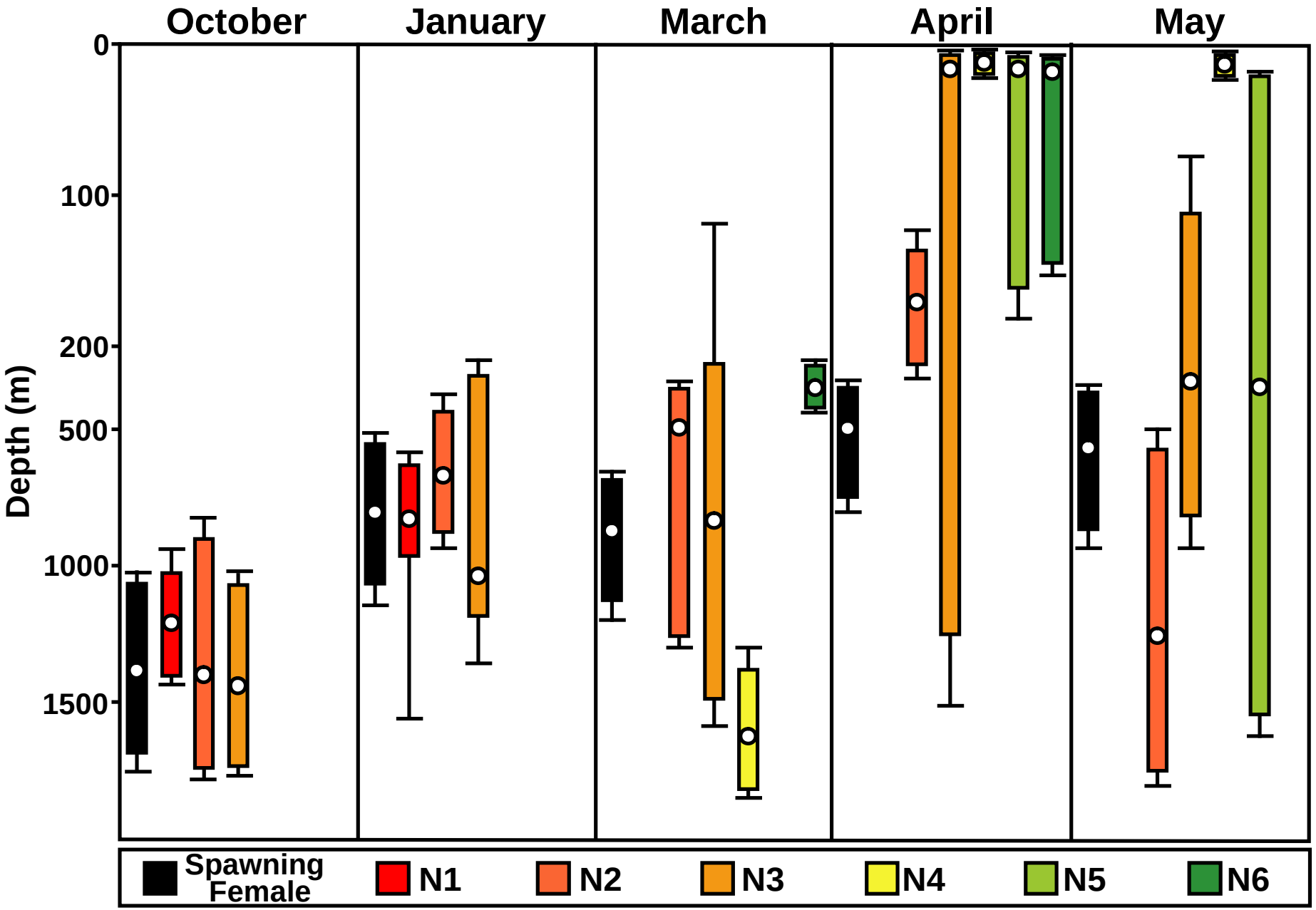

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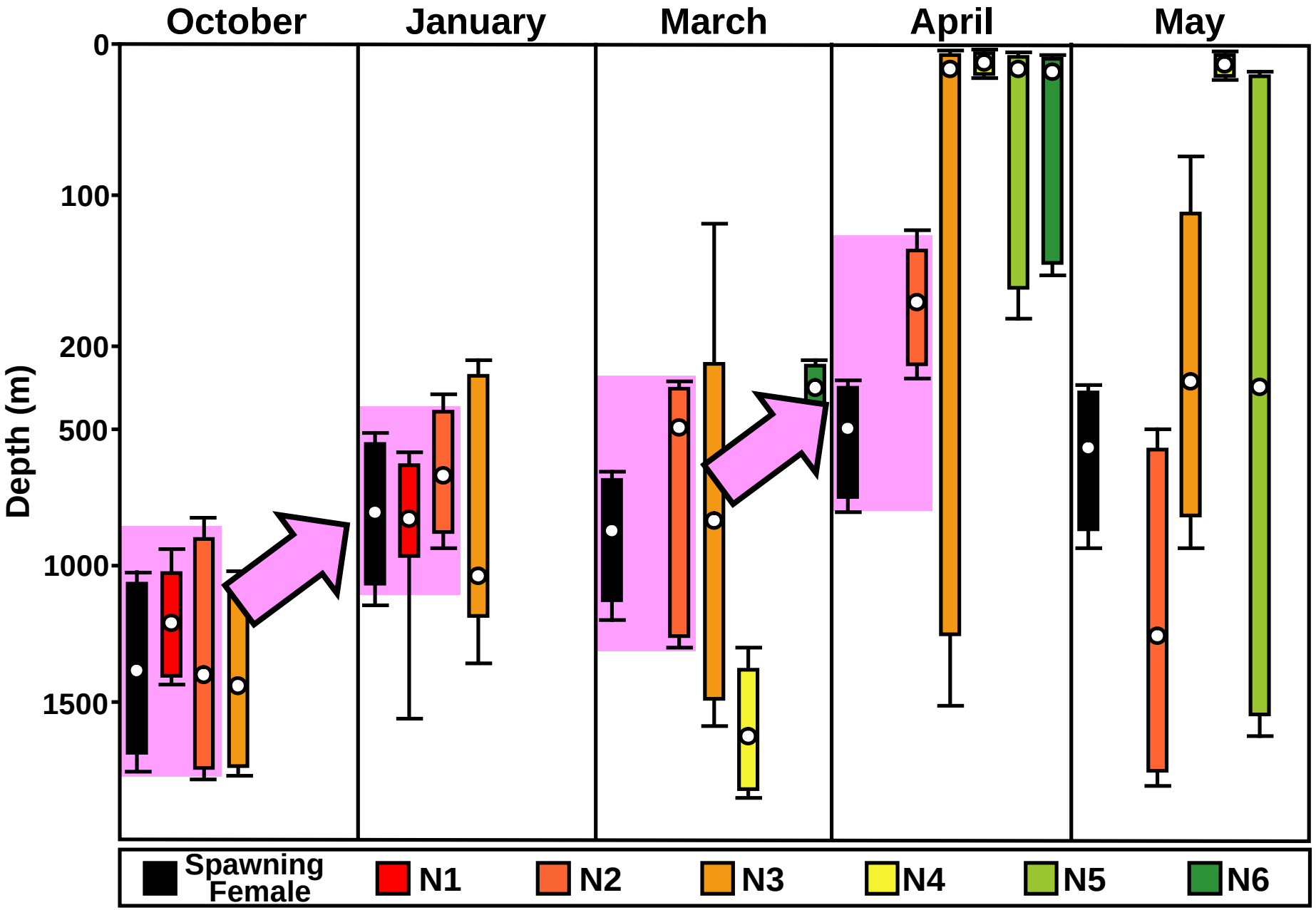

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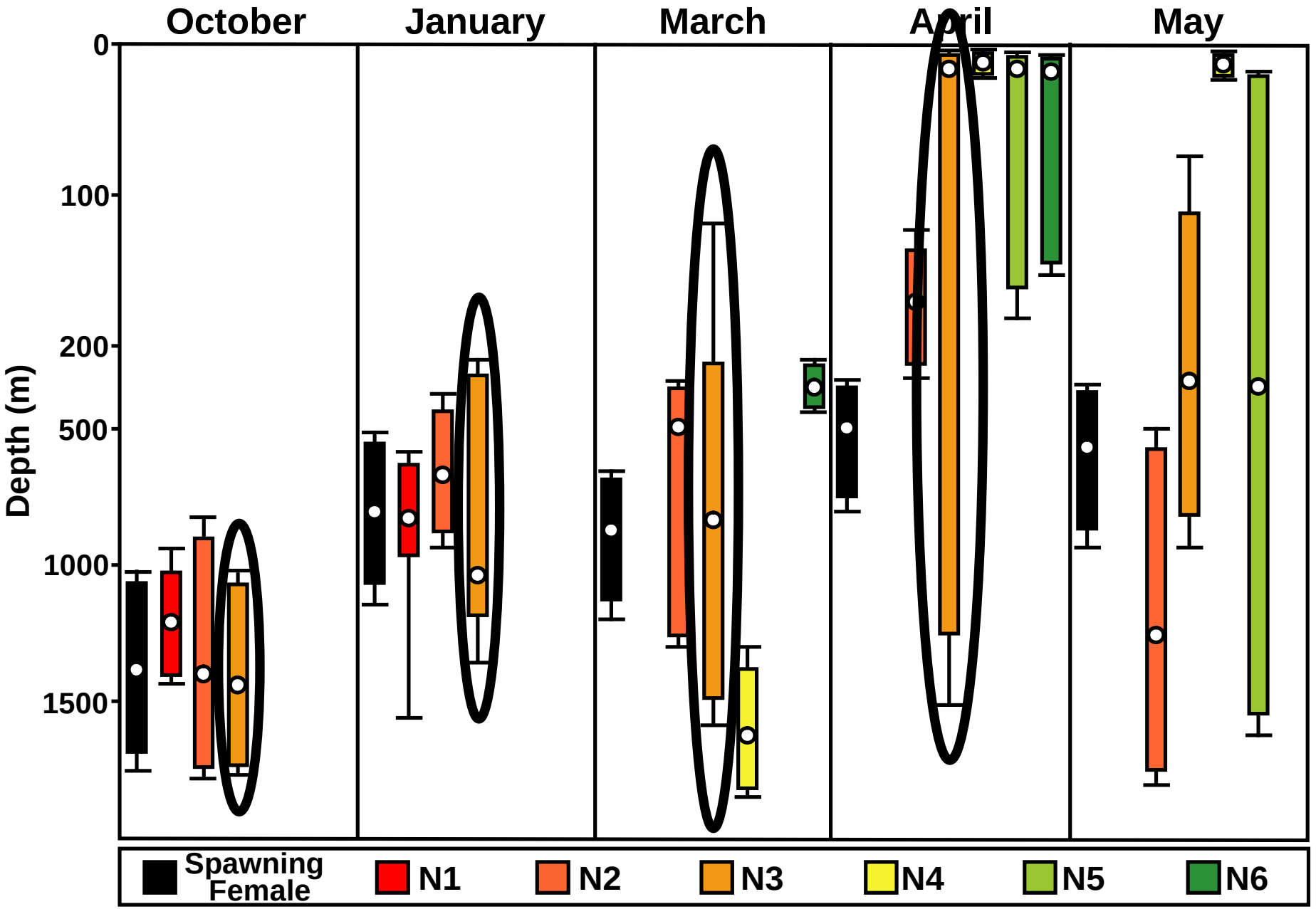

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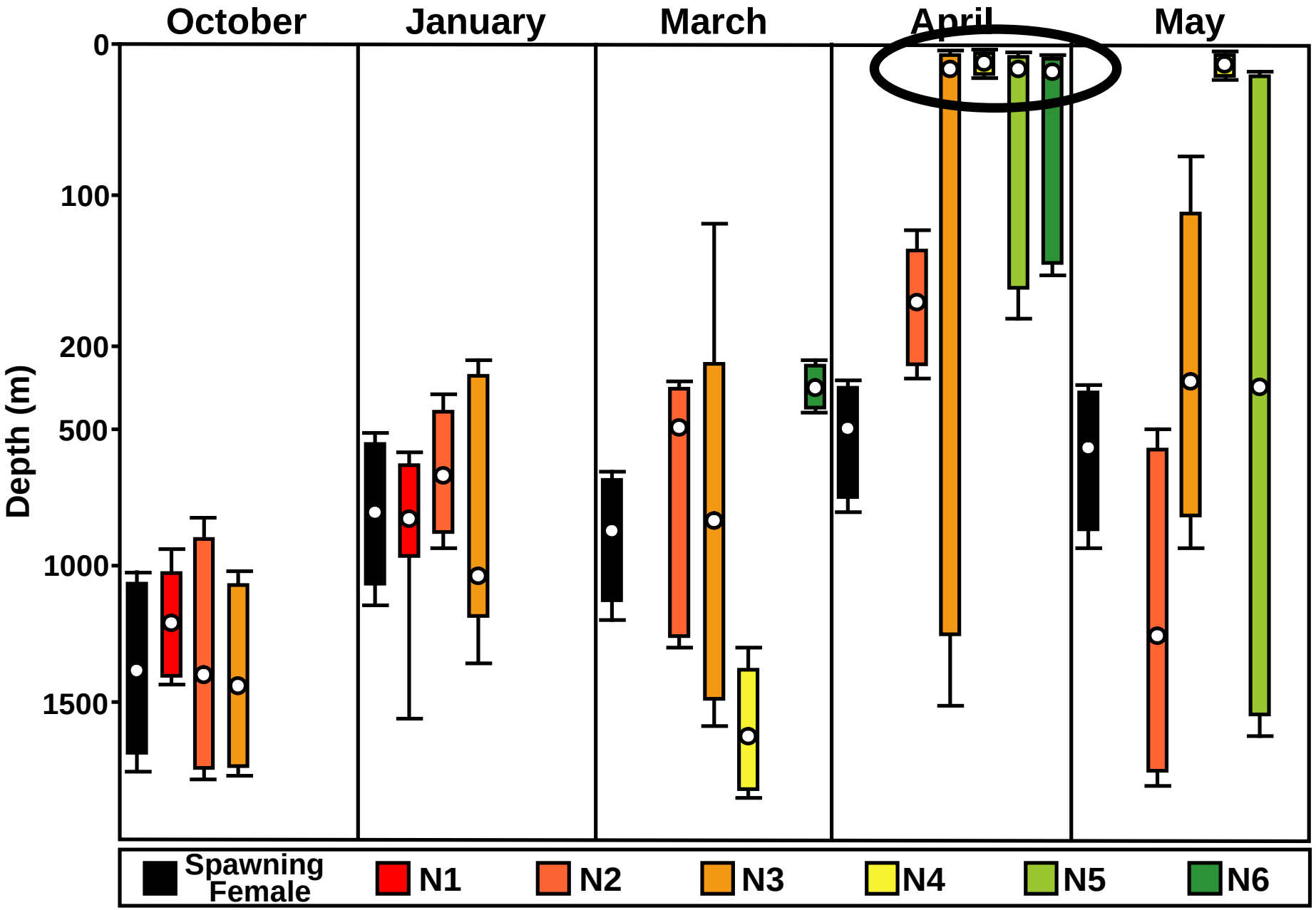

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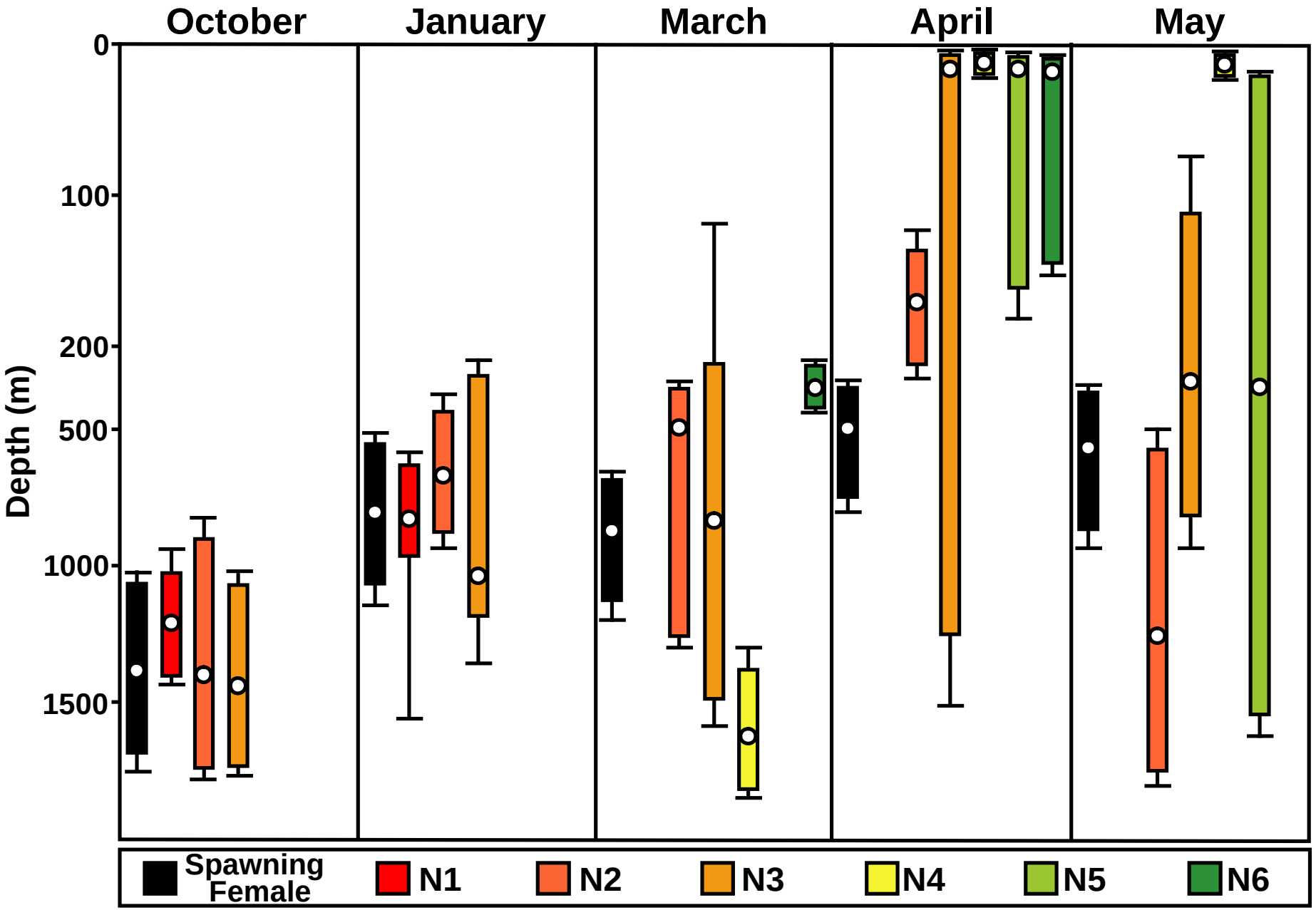
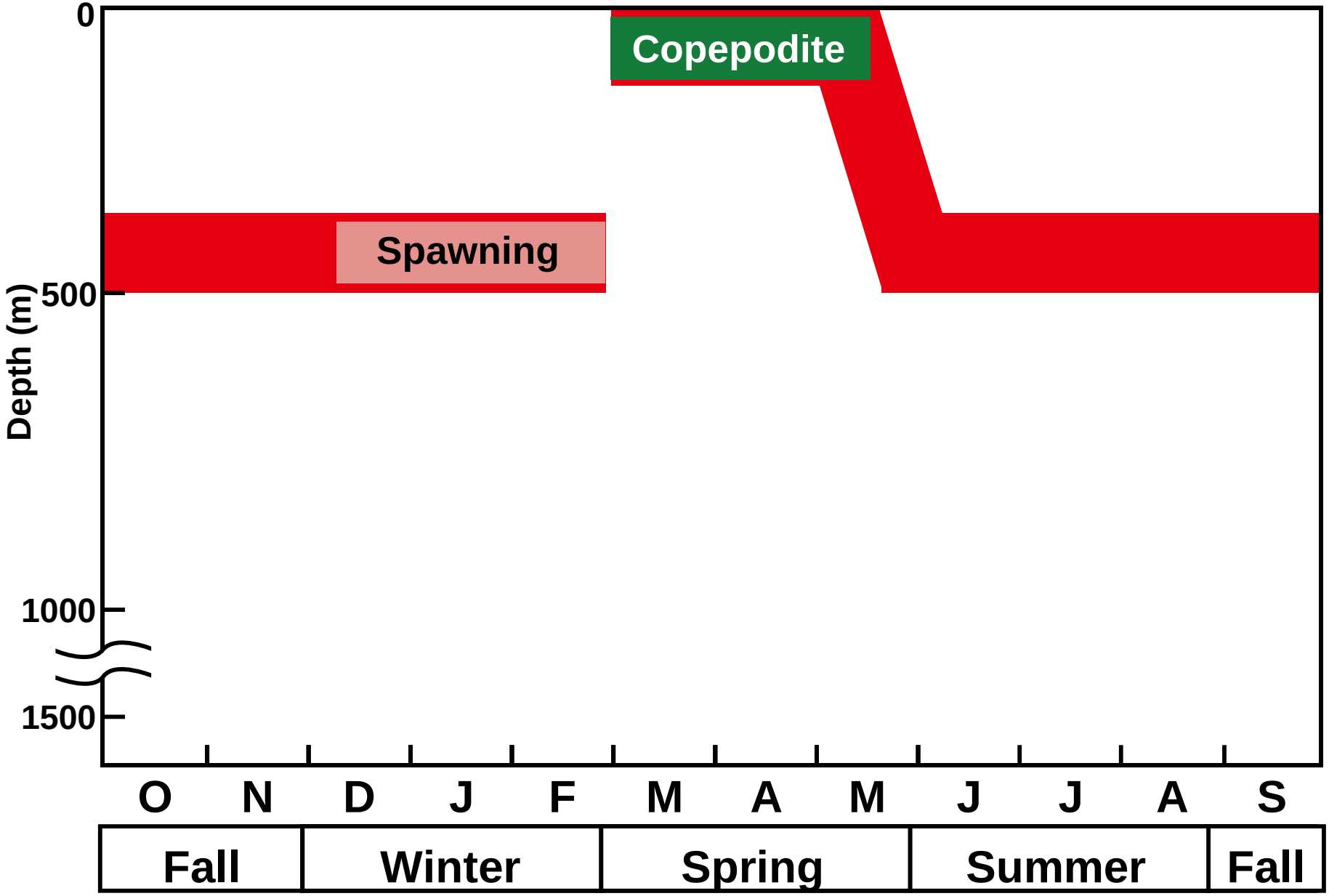


Life history of *Neocalanus flemingeri*



（Tsuda et al. 1999; Kobari and Ikeda 2001b）

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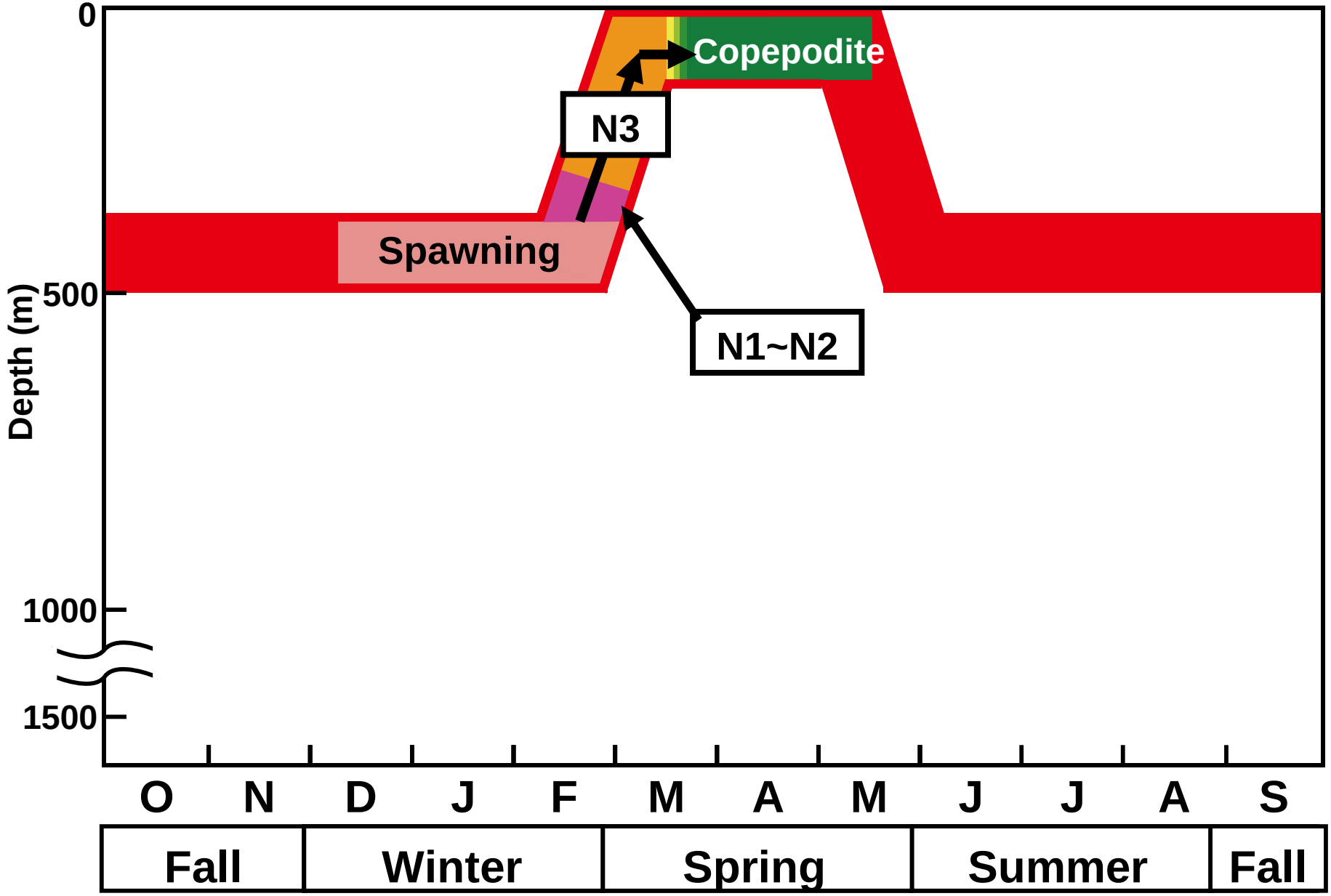

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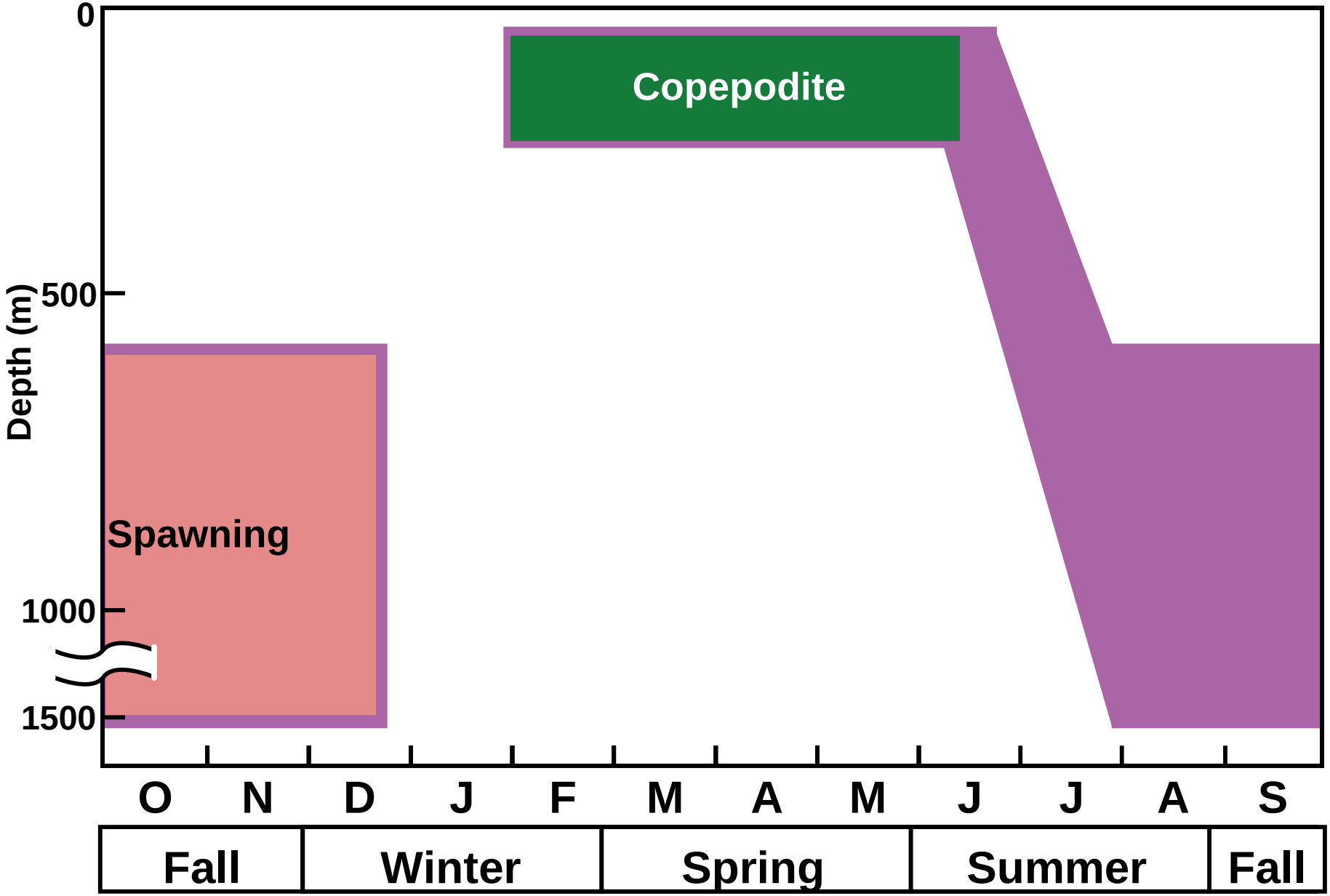
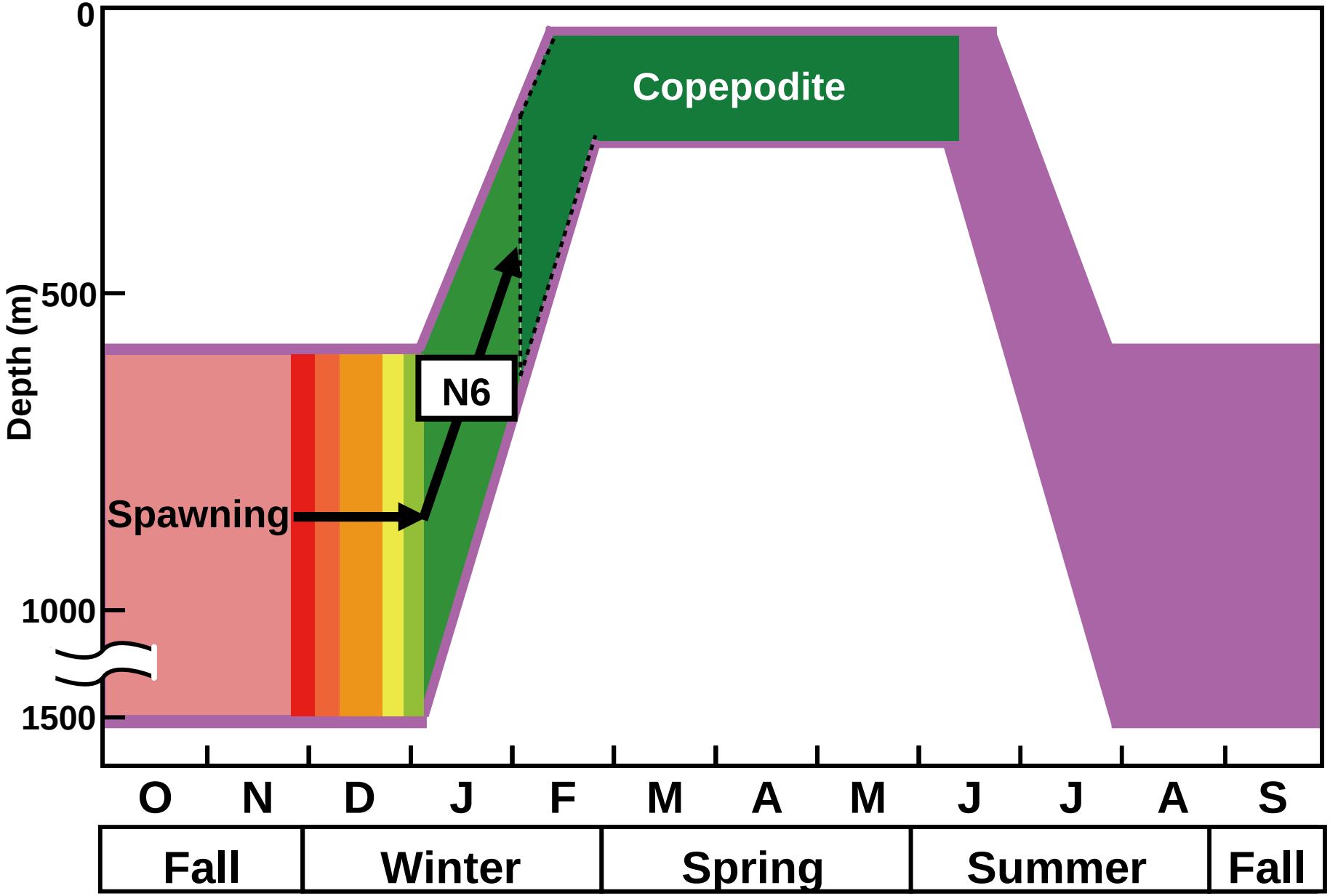


(Kobari and Ikeda 1999)

Life history of *Neocalanus cristatus*



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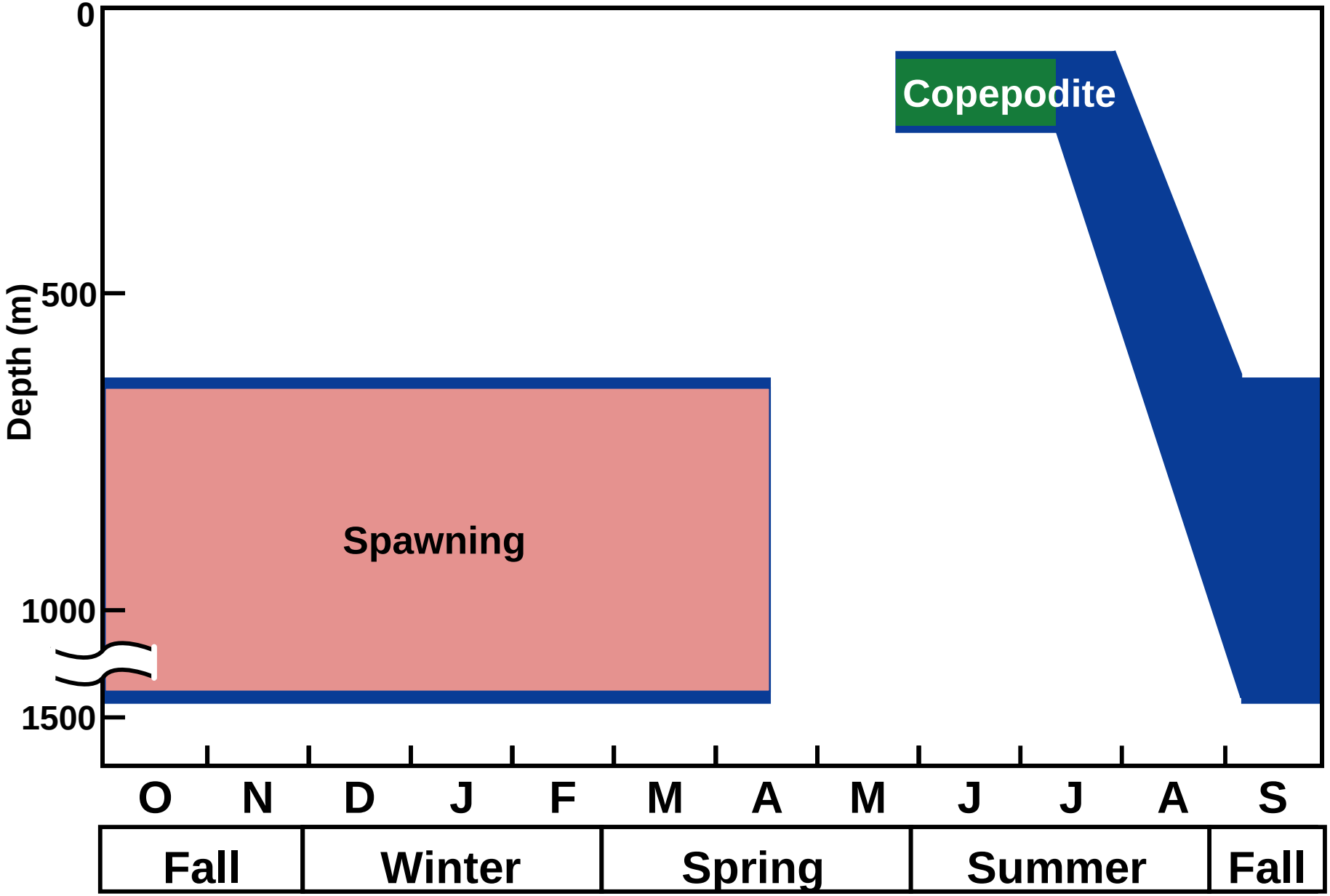

(Kobari and Ikeda 1999)

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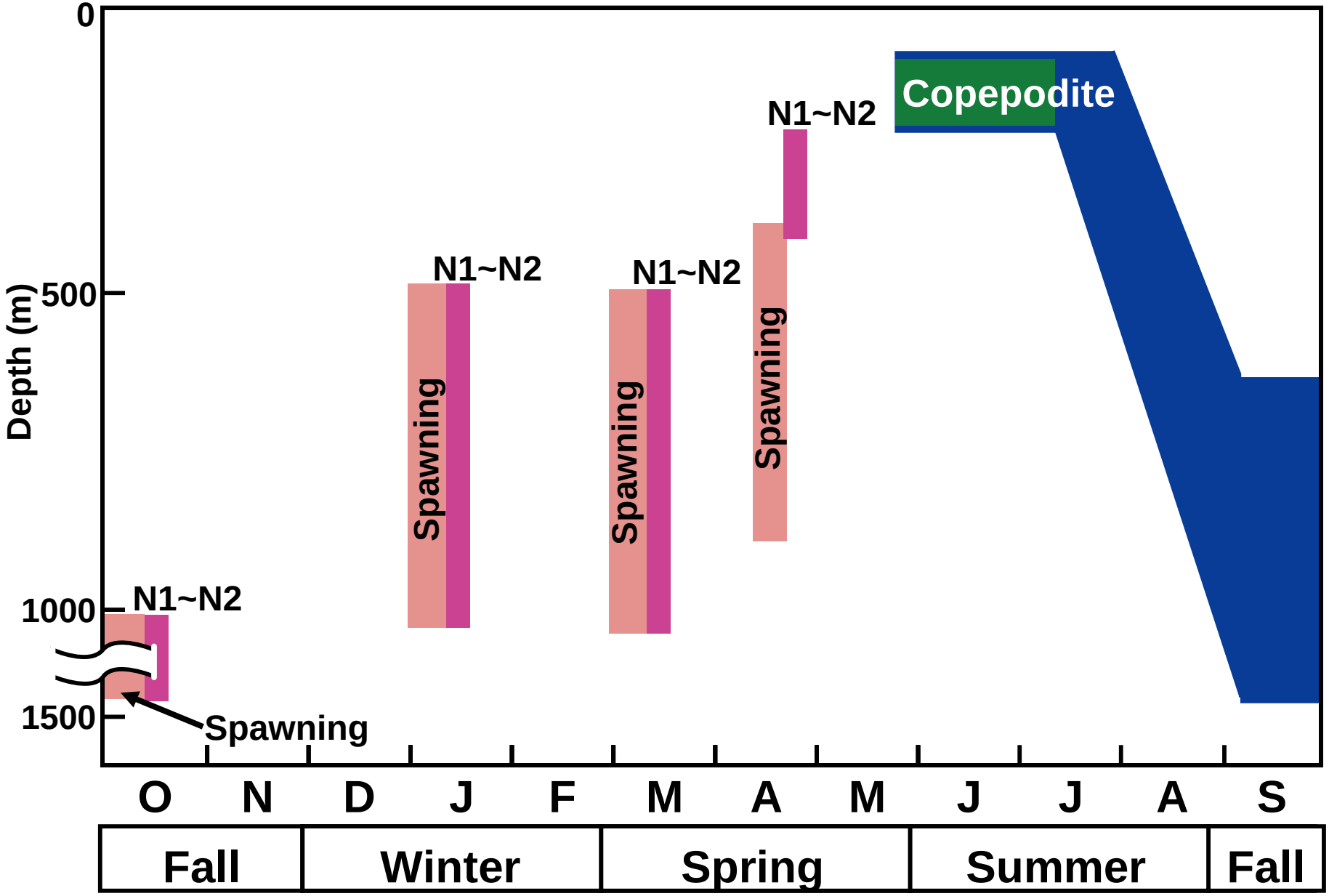
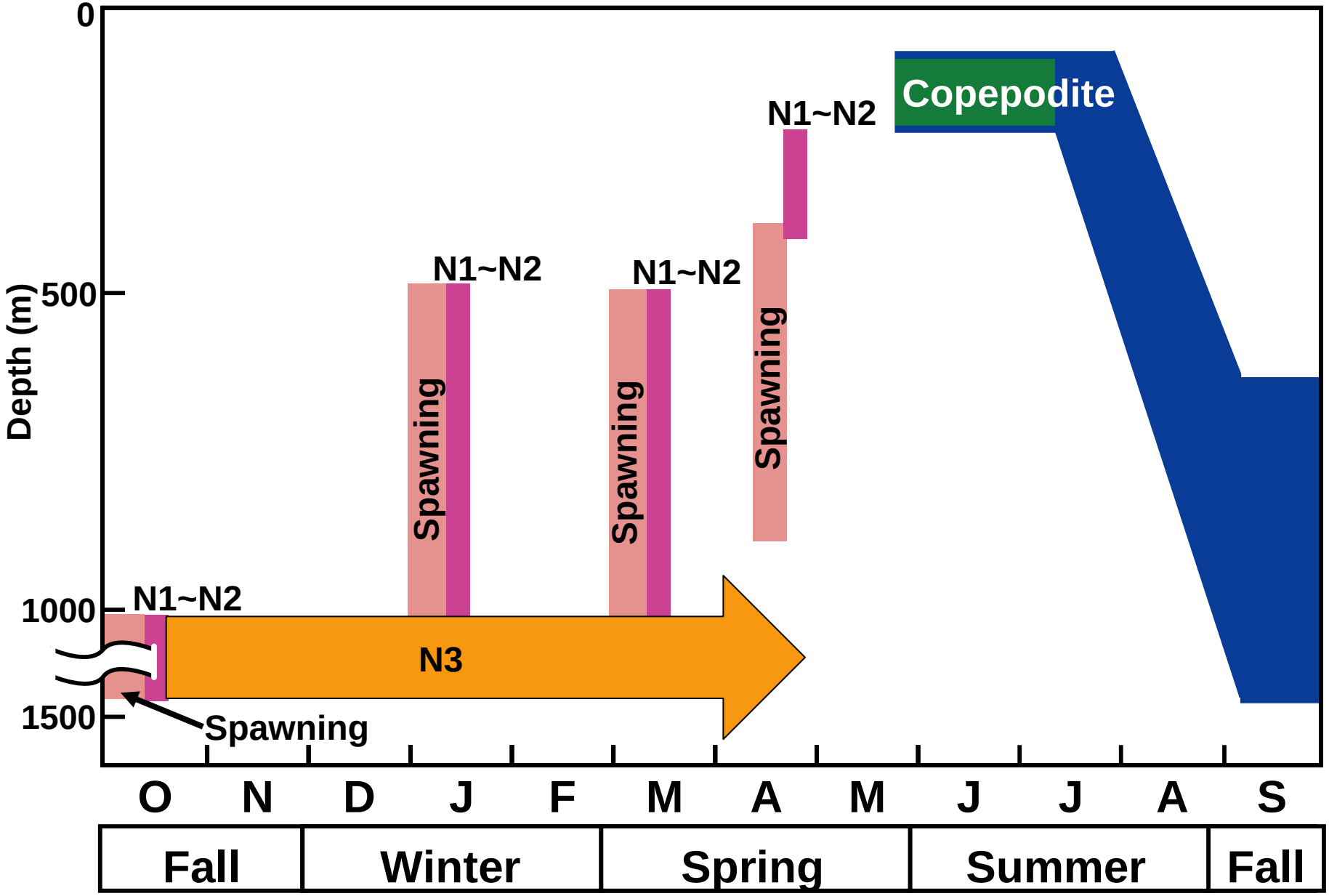


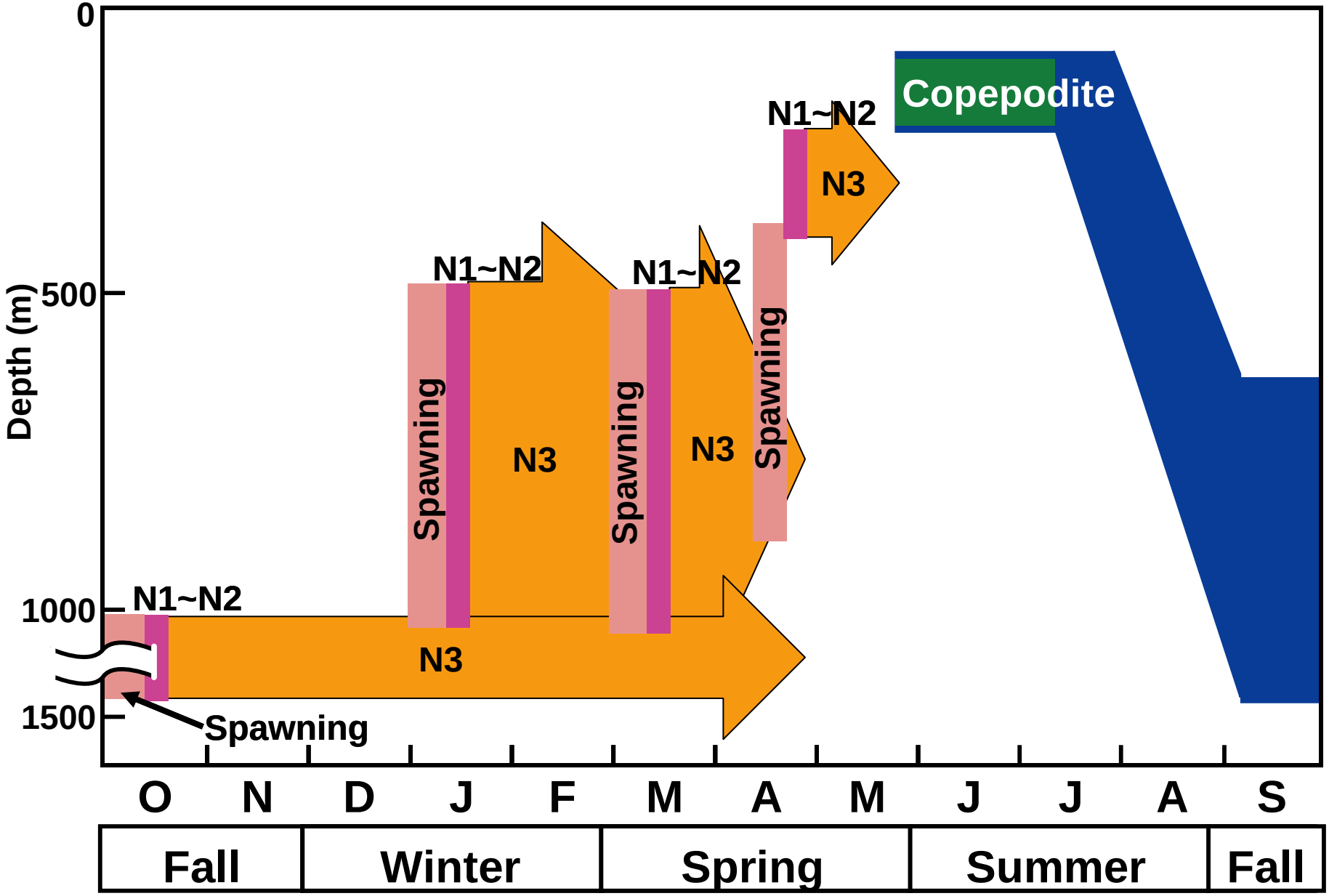
(Kobari and Ikeda 1999)

Life history of *Neocalanus plumchrus*



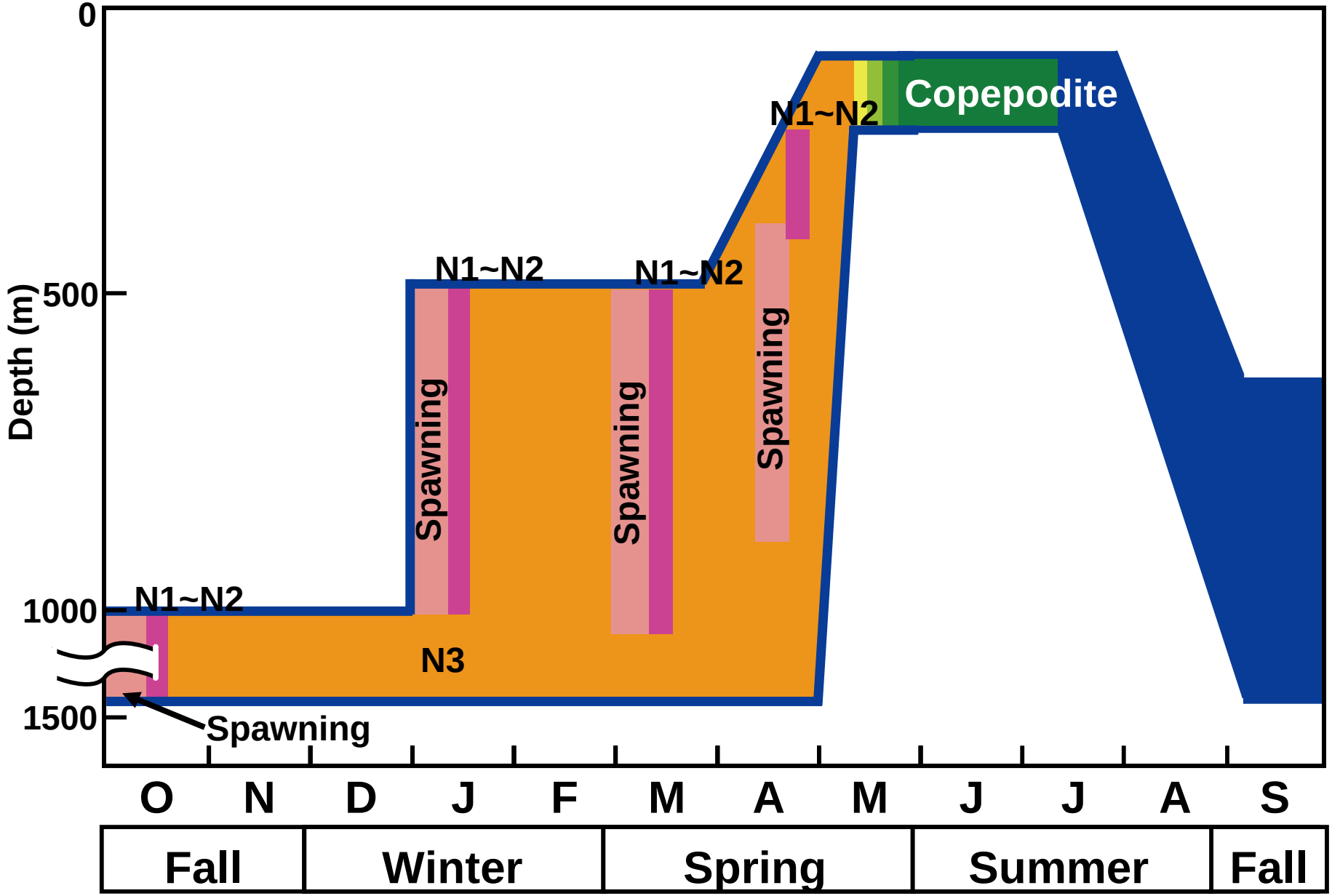
(Kobari and Ikeda 1999)

Life history of *Neocalanus plumchrus*



(Kobari and Ikeda 1999)

Life history of *Neocalanus plumchrus*



(Kobari and Ikeda 1999)

Conclusion

- **Succesfully revealed the early life history of 3 *Neocalanus* species**

  →3 species have different early life histories

- **Verified the hyposesis of *N. plumchrus* life history**

  →N3 stop development

  →Regulate the synchronous migration and development

Thank you very much