Use of C & N stable isotopes to evaluate interspecific trophic diversity among amphipods from *Posidonia oceanica* meadows

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INTRODUCTION

Amphipods from *Posidonia oceanica* meadows :

- Important component of the vagile fauna
- Potential importance in organic matter transfers from producers to higher level consumers

But trophic ecology still poorly known...

➔ Use of **C & N stable isotopes as trophic tracers**

MATERIAL & METHODS

Study site: Calvi Bay (NW Corsica), near the STARESO research station (8°43'E, 42°34'N). Samples taken at a depth of 10 m in 03/2008.

Amphipods : Collection using a hand-towed net and light traps [1]. Individual measurements for $\delta^{13}C$. Pooled measurements for $\delta^{15}N$.

Potential food sources : *P. oceanica* leaves & litter, epiflora & epifauna from the leaf stratum and the litter, suspended and benthic particulate organic matter (SPOM and BPOM, particle size < 1mm in both cases).

RESULTS & DISCUSSION

I. Insights from $\delta^{13}C$ measurements (Fig. 1)

1. Amphipod species cover a **wide range** of values (from -17 to -27‰).

2. Intraspecific variability highly differs from one species to another (e.g. *D. spiniventris* vs. *A. rubella*).

3. Most food sources and amphipods are found within -18 and -21‰, showing considerable **overlap**.

4. *D. spiniventris* seem to feed on **SPOM**.

5. *Gammarus* sp. may assimilate ***Posidonia* litter** (already noted for *G. aequicauda* by [2])

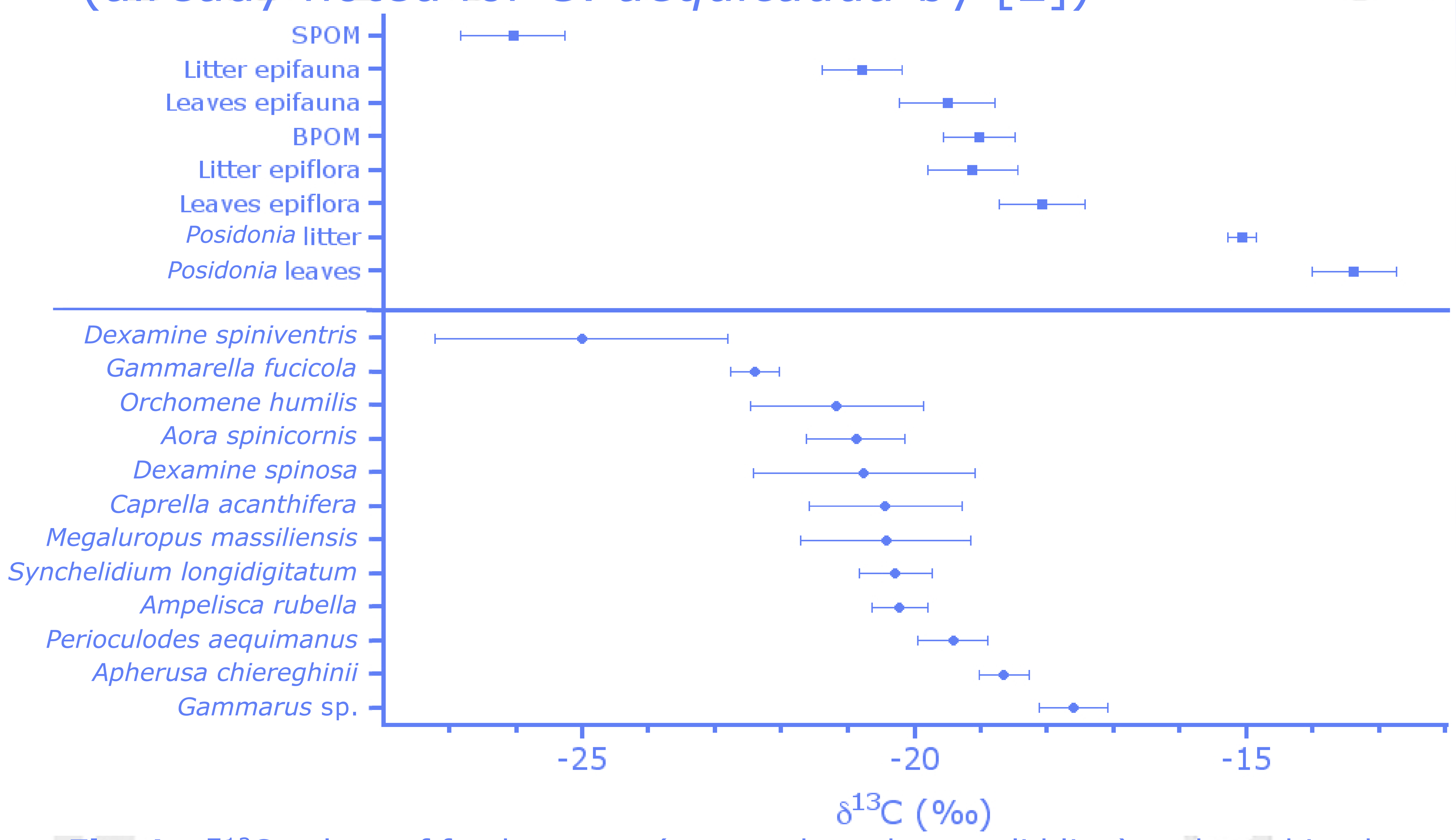

Fig. 1 : $\delta^{13}C$ values of food sources (square dots above solid line) and amphipods (circle dots below solid line). All values are means ± SD.

II. Crossing $\delta^{13}C$ and $\delta^{15}N$ data (Fig. 2)

1. Confirmation of points I.3 & I.4

2. Better discrimination, but still some overlap between some food sources (BPOM & litter epiflora) and amphipod species (*A. rubella* & *O. humilis*)

3. $\delta^{15}N$ sources = 1-3‰, $\delta^{15}N$ amphipods = 3-4‰ } **$\Delta^{15}N$ < 3‰ !**

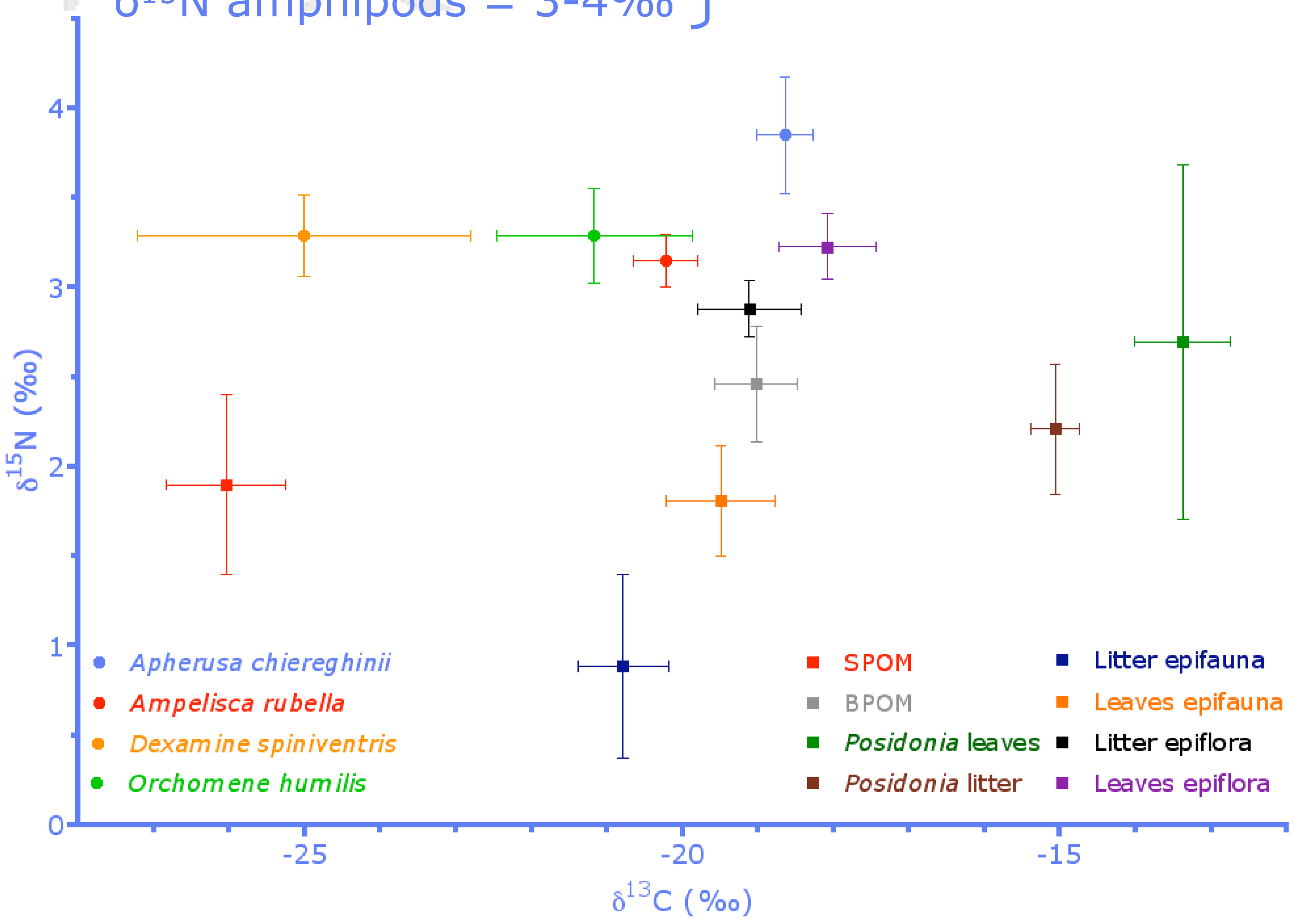

Fig. 2 : $\delta^{15}N$ vs. $\delta^{13}C$ plot of food sources (square dots) and amphipods (circle dots). All values are means ± SD.

III. Use of the IsoSource mixing model (Fig. 3)

With high tolerance (0,2‰), aggregation of BPOM and litter epiflora, $\Delta^{13}C$=0 and $\Delta^{15}N$=1 [3].

1. No major contributions of seagrass carbon

2. *D. spiniventris* : Very high contribution of SPOM (85 % of diet), robust frequency distribution (fig. 3B)

3. *O. humilis* & ***A. rubella*** : Low to medium contribution of all sources

A. chiereghinii : High contribution of epiflora from the leaf stratum (50%)

BUT very wide frequency distribution (fig. 3C) !

➔ Contribution estimates yielded by the model :
Reliable for *D. spiniventris*
Unconsistent for the other species...

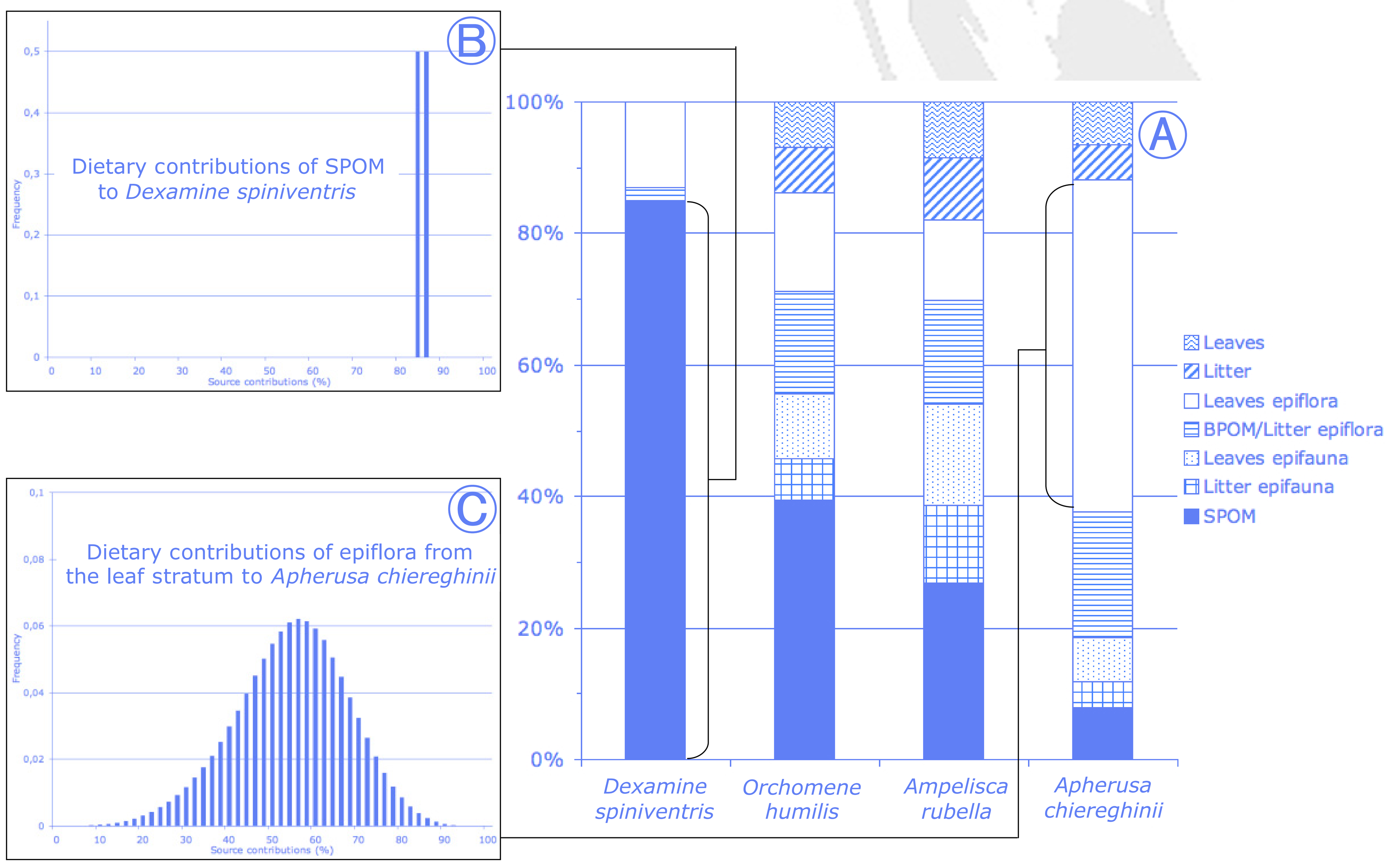

Fig. 3 : IsoSource outputs. A : Mean relative contributions of each food source to the diet of the 4 dominant species. B & C: Full frequency distribution of the possible contributions of (B) SPOM to *D. spiniventris* diet, and (C) leaf stratum epiflora to *A. chiereghinii* diet.

CONCLUSIONS

- Considerable interspecific trophic diversity : most species seem to feed on epiphytic organisms, but other exploit alternative food sources (SPOM)
- Need of stronger datasets and more appropriate fractionation estimates for efficient mixing model forcing
- Interest of confronting SI with other techniques (gut content, fatty acids) to enhance discrimination and reduce the number of potential sources !

REFERENCES

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ACKNOWLEDGEMENTS

LM is a Research Fellow of the Belgian National Fund for Scientific Research (FNRS), and FN is a FNRS Postdoctoral Researcher. This work was partly funded by the French Community of Belgium ("RACE" Project, ARC-05/10-333).