lengths per swimming cycle). Swimming speed was found to be frequency-regulated, while the wavelength of the propulsive wave appeared to be constant. Hence, the speed of the propulsive wave increases with increasing swimming speed. The amplitude of the propulsive wave is minimal just posteriorly to the head and increases considerably to reach a maximum at the tail tip. The mechanical efficiency was found to increase in a hyperbolical manner with increasing swimming speed. Both the propeller efficiency and the specific stride length are thus maximal at high swimming speeds (more than 2.5 body lengths per second), with values of about 0.67 and 0.38 respectively. These characteristics are also typical for anguilliform swimmers among fishes. For the eel (*Anguilla anguilla*), comparable propulsion wave characteristics have since long been described (1). A propeller efficiency of 0.65 (2) and a stride length of 0.49-0.55 body lengths per second (1, 3) were calculated. Despite the striking analogy in swimming kinematics for the axolotl and the eel, the considerable difference in stride length might reflect a different underlying swimming mechanism. This can be due to a different muscle activation pattern, but to morphological differences as well. For instance, the more homogeneous cross-sectional shape and mass distribution over the eel body when compared to the axolotl, might be related to the observed difference in stride length and reflect a different swimming mechanism. *Supported by I.W.O.N.L. grant 920137 (K.D.) and F.K.F.O. grant 2.9005.90 (F.D.V.).*

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17 THE ACTUAL FOOD OF MACROCONSUMERS GRAZING ON LEAVES OR INGESTING DETRITUS OF *POSIDONIA OCEANICA* SEAGRASSES : A δ^{13} C STUDY.

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The grazers *Paracentrotus lividus* (Echinoid), *Idotea baltica* (Isopod) and *Sarpa salpa* (Teleost), and the detritivorous *Holothuria tubulosa* are among the only macroconsumers observed feeding on *Posidonia* seagrasses material in the Mediterranean. A question however remains : do these animals actually assimilate the organic matter of this tough plant or do they preferentially feed on its epiphytes ? The analysis of stable carbon isotope ratios in animal tissues allows to elucidate the origin of organic carbon because δ^{13} C of the two plant groups are well distinct (between -14 and -11‰) clearly showing that this isopod assimilates seagrass carbon (this is confirmed by laboratory feeding

experiments). The viscera of the *Paracentrotus* sea urchin present a mean δ^{13} C of -17.8 ‰, giving evidence of an epiphyte-based dietary. *Sarpa* δ^{13} C values range from -16.4 (gut wall) to - 18.6‰ (liver), showing that this fish, though it obviously ingests *Posidonia* blades, preferentially assimilates epiphytic carbon; it is worth noticing that *Sarpa* also feeds on large seaweeds growing beside the seagrass bed. The sea cucumber *Holothuria*, eating sediments within the bed (whose δ^{13} C averages -15.5‰, intermediate between *Posidonia* and epiphytes) has tissue δ^{13} C values close to its food source (except for the hemal systgem; -17.9‰); values for faeces are slightly more enriched in δ^{13} C than food, indicating a preferential assimilation of epiphytic carbon. In conclusion, it appears that *Posidonia* carbon plays a minor role in the diet of the seagrass bed macroconsumers and that inconspicuous epiphytic algae, despite their apparent small standing stock, constitute the main carbon source for herbivores.

18 POTENTIAL SELECTIVE PRESSURES AND HOST PLANT SELECTION IN A GALL-FORMING FLY.

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Lipara lucens (Diptera, Chloropidae) is a strict monophagous gall-forming parasite of the common reed, *Phragmites australis* (Poaceae). When *Lipara* galls are opened, a number of larvae turn out to be parasitized or eaten by birds. Here, we analyse the influence of hostplant resistance and natural enemies on hostplant selection. To analyse the impact of the herbivorous enemies, we carried out a field experiment. Galls were collected in several reedbeds and transported to the laboratory where they were dissected and the contents identified. The results show that survival of *L. lucens* is shootdiameter dependent. All mortality factors together give rise to a higher survival chance of about 40% on the thicker shoots where all galls carried fully developed larvae. However, the mortality rate was highly different in the reedbeds sampled. In 43% of the localities, natural enemies are even completely absent. The diameter of a reedshoot also influences the survival of the *L. lucens* larvae. In a survival experiment, the highest proportion of galled shoots was found on thin shoots. Thicker shoots produced proportionally less galls. As a result, host resistance to herbivores and mortality due to parasitoids oppose an opposite, shootdiameter-dependent, selective pressure on the gall-forming herbivore. Female oviposition preference experiments showed the female flies oviposit on shoots where the expected larval performance is highest.