

**Estuaries and Coasts Vol. 30, No. 3, p. 459–468, 2007**Primary Production and Nutrient Content in Two Salt Marsh Species, *Atriplex portulacoides* L. and *Limoniastrum monopetalum* L., in Southern Portugal

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**ABSTRACT**

Seasonal variation patterns of aboveground and belowground biomass, net primary production, and nutrient accumulation were assessed in *Atriplex portulacoides* L. and *Limoniastrum monopetalum* (L.) Boiss. in Castro Marim salt marsh, Portugal. Sampling was conducted for five periods during 2001–2002 (autumn, winter, spring, summer, and autumn). This study indicates that both species have a clear seasonal variation pattern for both aboveground and belowground biomass. Mean live biomass was 2516 g m<sup>-2</sup> yr<sup>-1</sup> for *L. monopetalum* and 598 g m<sup>-2</sup> yr<sup>-1</sup> for *A. portulacoides*. Peak living biomass, in spring for both species, was three times greater in the former, 3502 g m<sup>-2</sup> yr<sup>-1</sup>, than in the latter, 1077 g m<sup>-2</sup> yr<sup>-1</sup>. For both the Smalley (Groenendijk 1984) and Weigert and Evans (1964) methods, productivity of *L. monopetalum* (2917 and 3635 g m<sup>-2</sup> yr<sup>-1</sup>, respectively) was greater than that of *A. portulacoides* (1002 and 1615 g m<sup>-2</sup> yr<sup>-1</sup>, respectively). Belowground biomass of *L. monopetalum* was 1.7 times greater than that of *A. portulacoides*. In spite of this, the root:shoot ratio for *A. portulacoides* was greater throughout the year. This shows that *A. portulacoides* allocates more biomass to roots and *L. monopetalum* to aerial components. Leaf area index was similar for both species, but specific leaf area of *A. portulacoides* was twice that of *L. monopetalum*. The greatest nutrient contents were found in leaves. Leaf nitrogen content was maximum in summer for both species (14.6 mg g<sup>-1</sup> for *A. portulacoides* and 15.5 mg g<sup>-1</sup> for *L. monopetalum*). Leaf phosphorus concentration was minimum in summer (1.1 mg g<sup>-1</sup> in *A. portulacoides* and 1.2 mg g<sup>-1</sup> in *L. monopetalum*). Leaf potassium contents in *A. portulacoides* were around three times greater than in *L. monopetalum*. Leaf calcium contents in *L. monopetalum* were three times greater than in *A. portulacoides*. There was a pronounced seasonal variation of calcium content in the former, while in the latter no clear variation was registered. Both species exhibited a decrease in magnesium leaf contents in the summer period. Manganese content in *L. monopetalum* leaves was tenfold that in *A. portulacoides*. Seasonal patterns of nutrient contents in *A. portulacoides* and *L. monopetalum* suggest that availability of these elements was not a limiting factor to biomass production.