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# Quality traits of *Procambarus clarkii* (girard) related to sex and refrigerated storage

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## ABSTRACT

The red swamp crayfish (*Procambarus clarkii*, Girard) is the most widespread alien species in Europe. Imported from Louisiana to southern Spain in 1973, where at present it is reared in crayfish farm and also diffused in the wild, it was introduced into Italy in the '80s and is now well established in natural environments of northern and central Italy. Naturalization of this alien species poses risks for aquatic ecosystems and its use as food may be a way to limit its spreading. The aim of this study was to analyse the morphological, mercantile and biochemical characteristics of male and female specimens of *Procambarus clarkii* and to evaluate changes in qualitative traits during refrigerated storage. Specimens of red swamp crayfish collected in a river, after a rearing period of 85 days in tanks, were harvested, killed by hypothermia and refrigerated (1°C). Male (n=31) and female (n=26) specimens were separated and measured for total body and abdomen length, 1 (n=10), 3 (n=16), 8 (n=16) and 10 days (n=15) after harvesting. They were weighed, sectioned to separate claws and tails (shell-on), which were weighed individually and their colour parameters (lightness, L\*; chromaticity indexes, a\* and b\*) measured in dorsal and ventral sites. A pooled sample consisting of tail muscle of 2-3 specimens having the same storage times was homogenized and analysed for total lipids, qualitative and quantitative fatty acid composition and malondialdehyde (MDA). The other tails (shell-on) were steamed, the exoskeleton removed and abdominal muscles (shell-off tails) analysed for colour parameters in dorsal and ventral sites, and for free water (by compression method). Data was analysed by GLM using the SAS Package, with sex, storage time and relative interaction (except for data of chemical analysis) as fixed effects. Females and males differed in total (p<0.05) and abdominal (p<0.01) length (8.65 vs 8.27cm and 4.32 vs 4.04cm, respectively) and in body weight (corrected for cheliped weight, due their lack in some cases; 16.35 vs 13.89g; p<0.05), however the cooked-meat yield of shell-on tails was similar (46.53 vs 42.93%; p=0.19). Regarding colour parameters, the two sexes only differed in L\*, which was significantly greater in males in the different sites of measurement, except the ventral site of raw shell-on tails. Males and females showed a similar water holding capacity of abdominal meat (mean 10.78±6.33cm<sup>2</sup>). No differences between the sexes were recorded for total lipids (mean 1.05±0.14%), MDA content and fatty acid profile (means SFA: 22.16%, MUFA: 28.40%, PUFA<sub>n6</sub>: 20.39%; PUFA<sub>n3</sub>: 28.80%; EPA: 18.24%; DHA: 7.17%). During refrigerated storage, a significant decrease in water holding capacity of muscle (free water increasing from 14.07 to 26.15cm<sup>2</sup> on days 1 and 10, respectively; p<0.001) and in cooked-meat yield (from 50.92 to 39.11% on days 1 and 10, respectively; p<0.01) and sharp changes in cooked tail muscle colour parameters were noticed. The latter body part showed a significant decrease (p<0.001) in a\* and b\* at the dorsal site and in L\* at the ventral site (77.74 and 49.14 on days 1 and 10, respectively) with increasing storage. During the refrigerated storage of the whole crayfish the changes recorded for the examined parameters indicate the quality decay, particularly after the 3<sup>rd</sup> day.