Reproductive traits of two populations of *Ligia italica* from Tunisia

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**INTRODUCTION**

*Ligia italica* (Fabricus, 1798), halophilic species, is widely distributed on the Tunisian rocky coasts. Reproductive phenology of two populations of *L. italica* from two different sites: the coastal lagoon of Ghar El Melh in the North (Bizerte) and the beach of Mahres in the South (Sfax) was studied.

**MATERIALS & METHODS**

- **Study area and sampling**
  The study area was the coastal lagoon of Ghar El Melh and the beach of Mahres (Sfax) in the Northeast and The Southeast of Tunisia, respectively (Fig.1, Fig.2, Fig.3). Quantitative samples, using a quadrat of 50 × 50 cm, were taken every month between January 2018 and June 2019. Sampling was carried out by hand search each time in the morning. Air temperature and air moisture were measured monthly in situ using a thermo-hygrometer.

- **Laboratory procedures**
  Collected specimens of each sample were preserved in 70% ethanol. Then, they were counted, sexed and sorted into males, reproductive and non-reproductive females, and undifferentiated under a Leica MS 5 stereomicroscope. All individuals were sized, from the anterior edge of the cephalon to the end of the pleotelson at ± 0.01 mm using a stereomicroscope (Leica MS5). The fecundity defined by the number of eggs in the marsupium was studied. Thirty ovigerous females early in the development of eggs (yellow rounded eggs) were measured, dissected and their content was moved into a petri dish; the eggs were counted.

- **Statistical analysis**
  The sex ratio was tested using the Chi² test. The relationship between the female size and fecundity was tested by correlation test while the monthly distribution of the different categories was carried out by the ANCOVA covariance analysis test.

**RESULTS**

- **Sex-ratio**

  The sex ratio fluctuates throughout the year but is skewed towards females with very important percentages in Mahres (Fig.4, Fig.5).

- **Breeding activity and climatic factors**

  *L. italica* shows seasonal reproduction, spread from mid-February until November followed by a three-months sexual rest in both regions (Fig 6). The presence of ovigerous females coincides with the rise in temperature and decrease in humidity, well marked in Ghar El Melh lagoon population.

- **Fecundity**

  - Positive correlation between fecundity and female body size was observed in both populations (Fig.7) \( r = 0.46, p < 0.005 \) in Ghar El Melh population; \( r = 0.73, p < 0.005 \) in Mahres population);
  - The number of marsupial eggs per ovigerous female is higher in the population of Mahres \( (25.35 ± 8.36) \) than that of Ghar El Melh \( (21.68 ± 6.70) \);
  - The size of the largest ovigerous female reaches 12.5 mm in Ghar el Melh and 13.9 mm in Mahres.

**CONCLUSION**

To conclude, *L. italica* exhibits a seasonal reproduction extending from mid-February, early March (depending on the year) until November followed by sexual rest. The overall sex ratio is biased in favor of females. For fecundity, it is positively correlated with the size of the females. But differences are highlighted at the level of fertility, significantly higher in Mahres than in Ghar El Melh and at the level of the maximum size of ovigerous females higher in the first station than in the second.