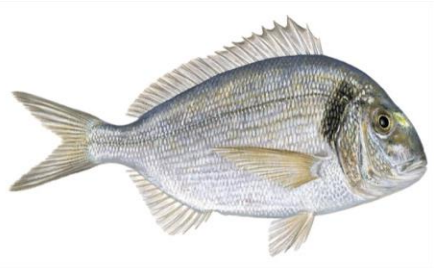


Differential expression of micro RNAs (miRNAs) in gonads of gilthead seabream *Sparus aurata*

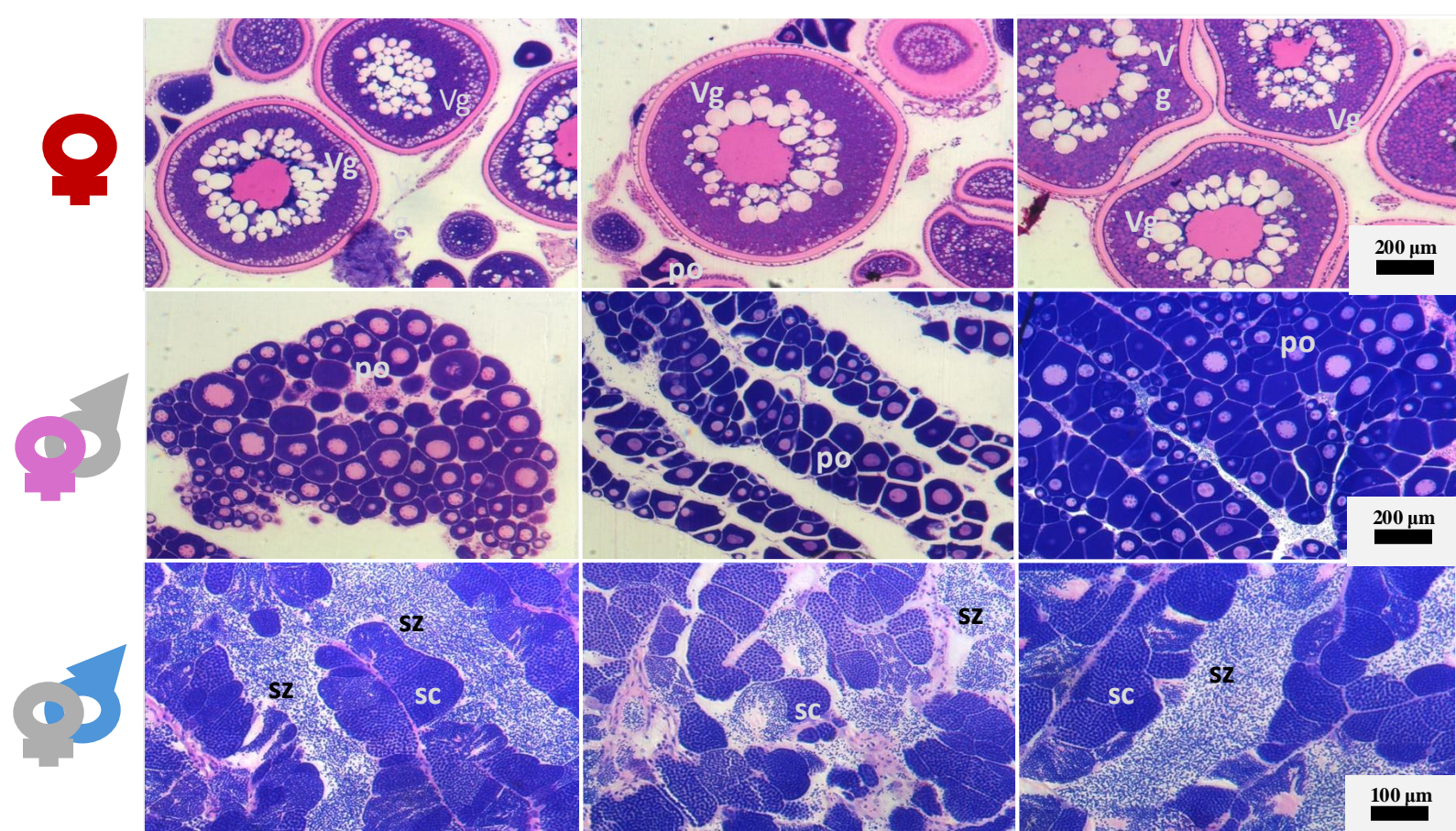
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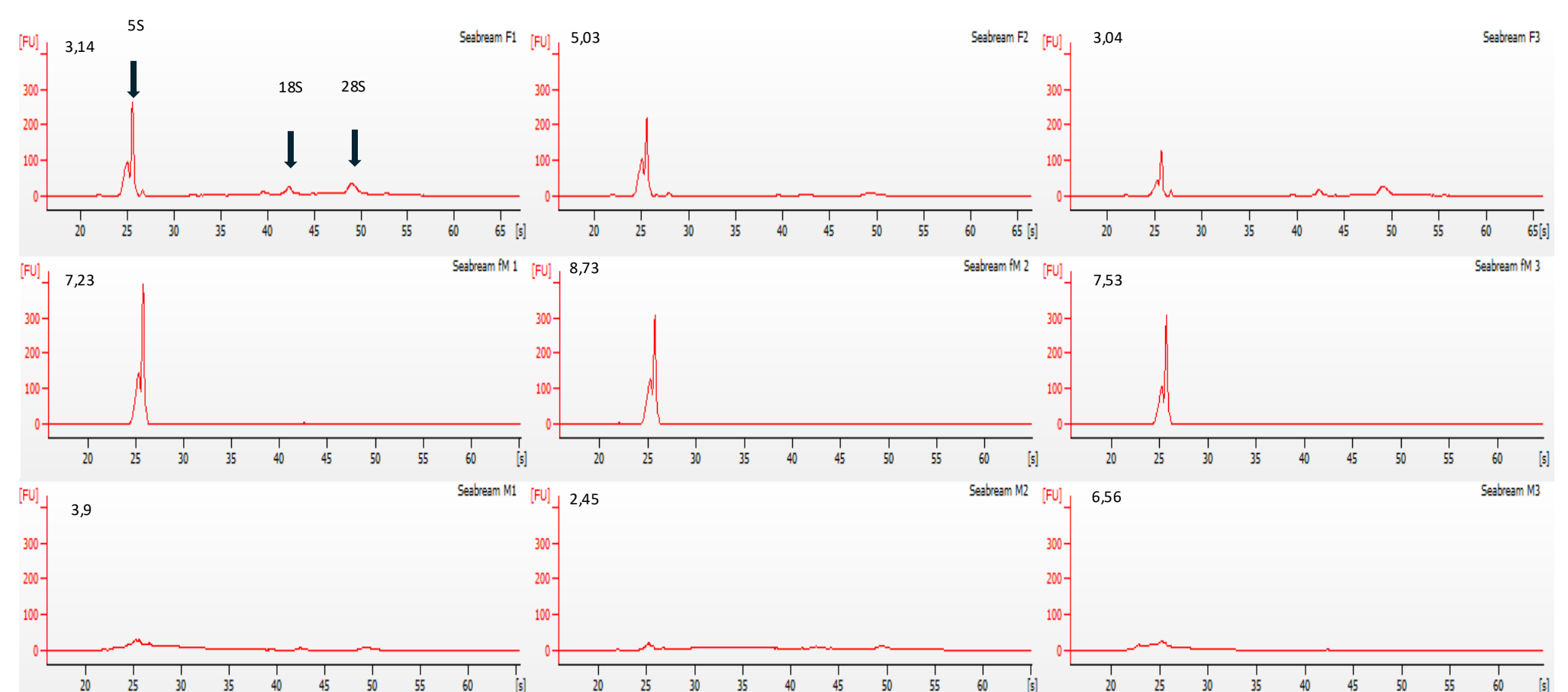
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OUR TARGET SPECIES: The gilthead seabream *Sparus aurata* is an important species for the Mediterranean aquaculture industry. It is a protandrous hermaphrodite that functions as a male for the first two years of life and then a proportion of fish reverse sex to female. Thus, in the spawning season, gonads may be female (F) or male, with functional male gonads exhibiting both a mature male (M) and an immature female part (fM).



Histological photographs of gonads collected from 6-year-old gilthead seabream during the spawning season. The first row shows the female gonads (F) and the second and third rows show the immature female part (fM) and the mature male part (M) of functional male gonads. Vg: vitellogenic oocyte, po: primary oocyte, sc: spermatocytes, sz: spermatozoa.

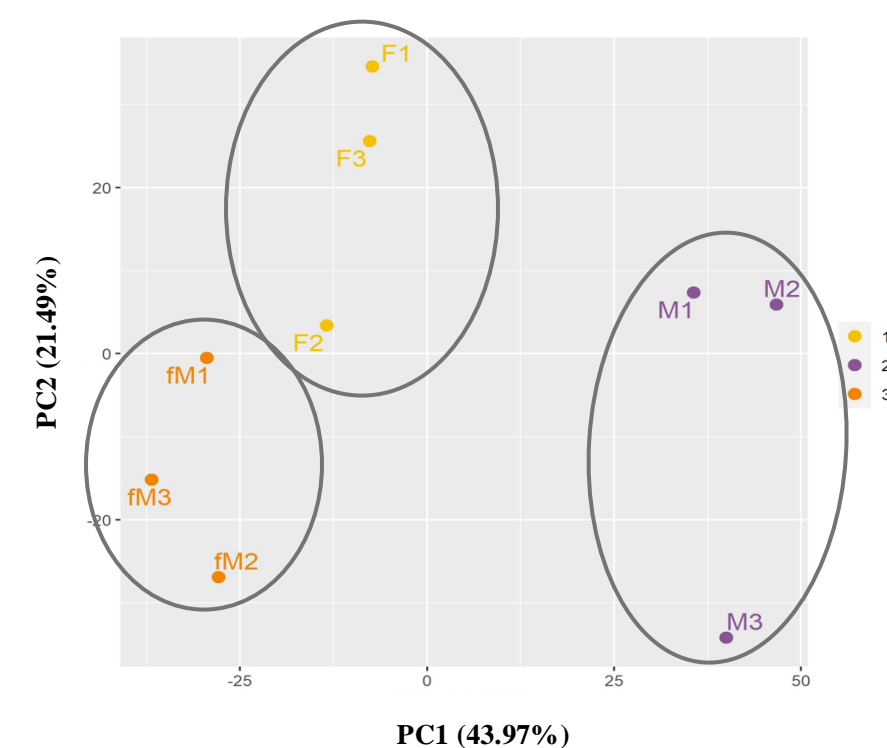
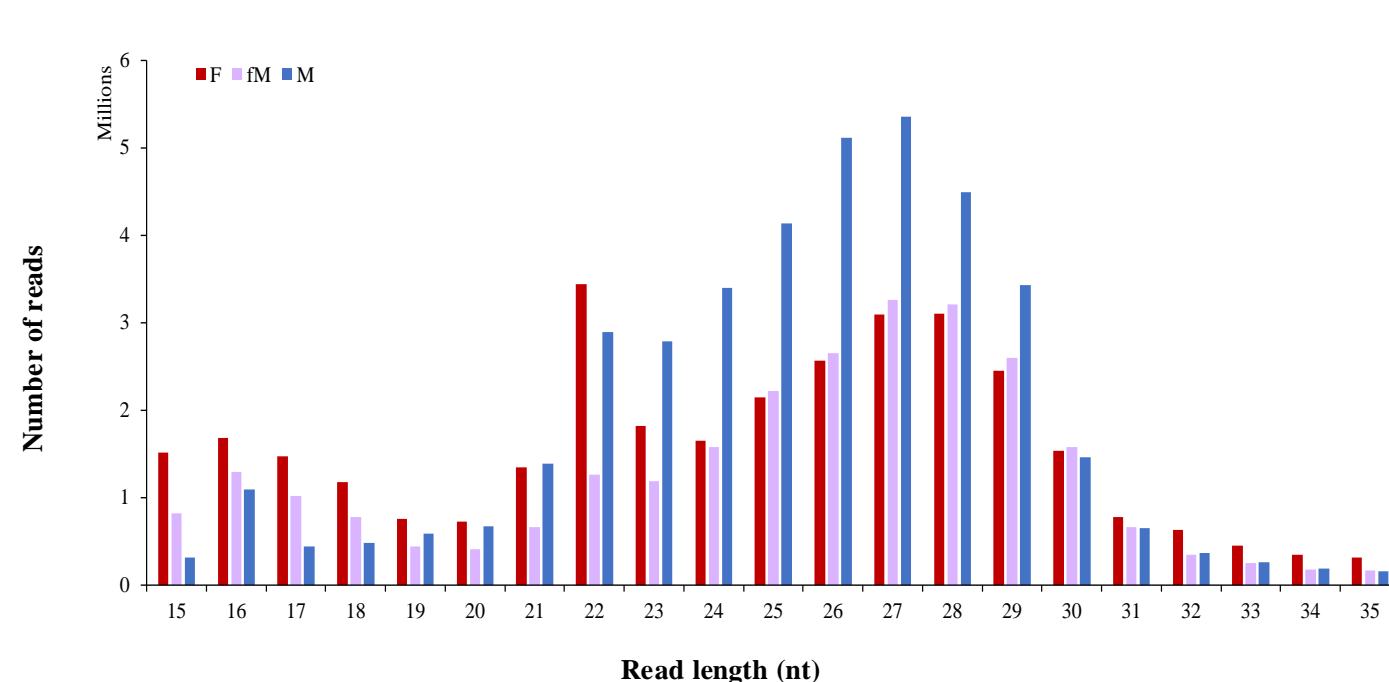


Electropherograms of total RNA of female gonads (row 1), immature female parts (fM, row 2) and mature male parts (M, row 3) of functional male gonads. The number shown on each chart represents the 5S/18S ratio.

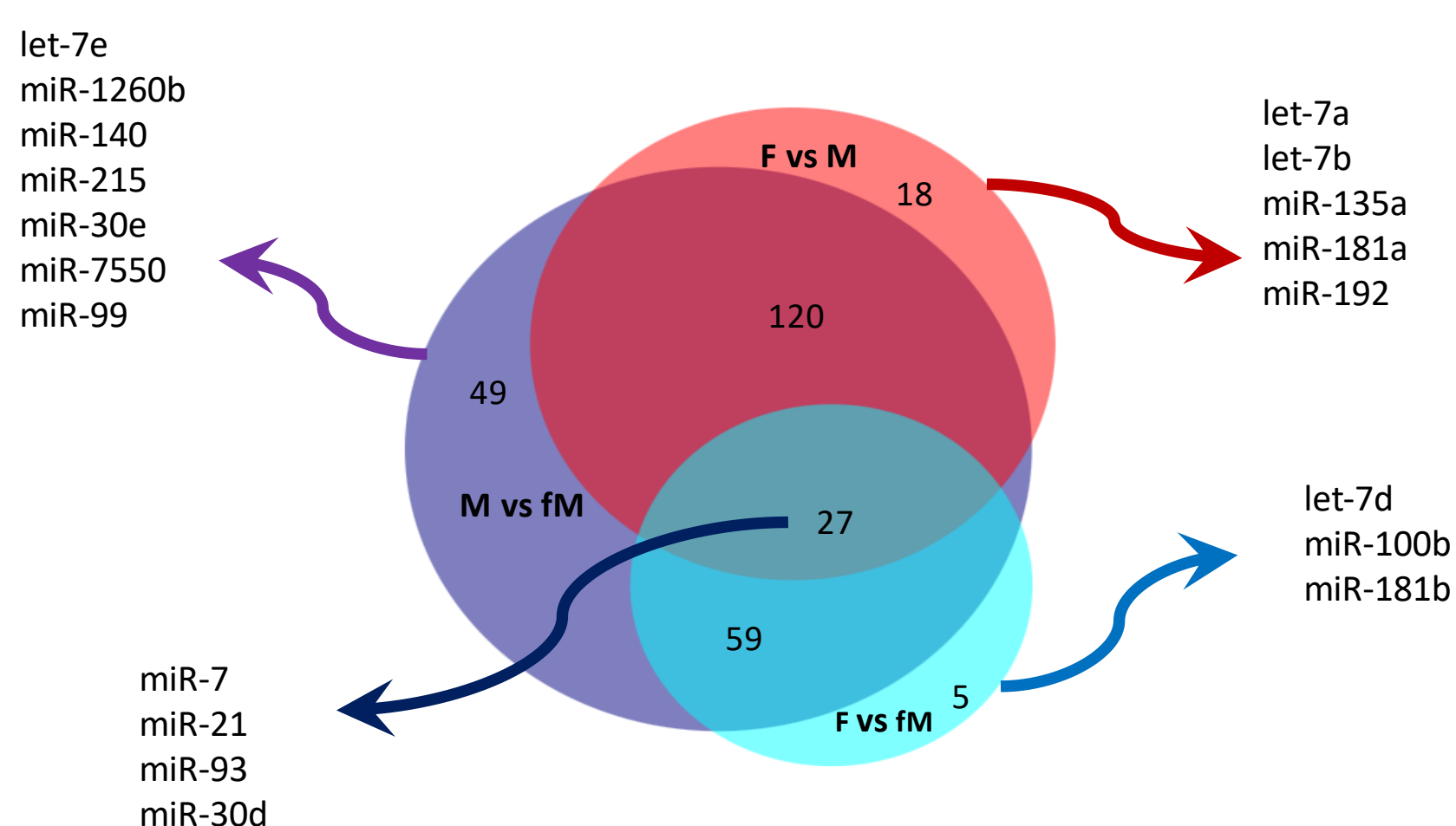
RESEARCH OBJECTIVE: Sex reversal and gonad maturation in fish is influenced by environmental factors, such as temperature and photoperiod. **MicroRNAs (miRNAs)** are temperature-sensitive non-coding RNAs that have been shown to target reproduction-related mRNAs, involved in processes such as germ cell differentiation, gametogenesis, steroidogenesis, and apoptosis. The aim of the present study was to explore the role of miRNAs in the F, M and fM gonadal tissues of gilthead seabream.

FINDINGS

Read length distribution of small RNA sequences of female (F, red), immature female part (fM, purple) and male part of functional male gonad (M) of gilthead seabream.



PCA analysis of small non-coding RNAs of female (F, yellow), immature female part (fM, orange) and male part of functional male gonad (M, purple) of gilthead seabream.



Venn diagram of differentially expressed miRNAs in the comparisons among the gilthead seabream female (F) gonads, the immature female part (fM) and the mature male part (M) of the functional male gonads. Selected differentially expressed miRNAs, common in all comparisons and unique in each comparison, are shown.

CONCLUSIONS

miRNAs are involved in the regulation of gene expression in female gonads, immature female part and mature male part of functional male gonads of gilthead seabream.

- Putative piRNAs, commonly found in fish gonads, may be also involved in reproductive processes in both female and male gilthead seabream.
- 27 common differentially expressed miRNAs were found among the three comparisons (e.g. miR-7, miR-21, miR-93 and miR-30d), suggesting that these miRNAs play a role in both male and female reproductive processes.
- Unique differentially expressed miRNAs were found in the three comparisons (5 in the F vs fM, 18 in the F vs M and 49 in the M vs fM comparison), suggesting that these miRNAs play specific roles in different reproductive processes between sexes and gonadal stages.

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