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Novel biotechnology for all-female prawn aquaculture by a single injection of hypertrophied androgenic gland cells

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Crustacean monosex aquaculture is advantageous since most species exhibit dimorphic size variation between males and females. In the case of the freshwater prawn, *Macrobrachium rosenbergii*, intensification of mixed cultures encounters difficulties due to the complex social structure, in which large dominant males are territorial and inhibit the growth performance of the rest of the population. Females on the other hand are less aggressive, less territorial and are suggested to exhibit a relatively homogenous size which does not require selective harvests during or in the end of the grow-out period. In the present study, a novel biotechnology to achieve *M. rosenbergii* monosex female populations was developed. Our biotechnology includes the following three steps: (1) a single injection of suspended hypertrophied androgenic gland cells (hAG cells) induced fully functional sex-reversal of females into 'Neo-Males' bearing the feminine WZ genotype; (2) crossing neo-males with normal females (WZ), yielded progeny containing ~25% WW females as validated by specific DNA sex markers and (3) WW females were crossed with normal males (ZZ) and gave rise to all-female progenies. This biotechnology enabled the first ever large-scale field study showing better performance for all-female prawn culture than mixed culture in all parameters including: Higher survival rate, higher yield per hectare and uniformity of marketable product size. Additionally, no males or egg carrying females were found while examining the harvest of tenth of thousands animals in the all-female ponds. The latter result points at the reliability of our technology to achieve all-female populations and its sustainability with respect to the non-reproductive nature of the monosex culture securing both protection of proprietary elite lines and avoiding environmental invasions by escapees.

Biography

Tom Levy is currently pursuing his PhD studies at Ben-Gurion University, Israel. He is studying the controlling mechanism behind sexual differentiation in crustaceans in order to shed light on crustacean's reproductive physiology which will also pave the way for the establishment of sustainable biotechnological tools to achieve monosex populations. With his colleagues from Ben-Gurion University and Enzootic Ltd., he has recently published a paper on a novel biotechnology to achieve all-female aquaculture of the giant freshwater prawn.

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