



Specificity of crowding response that induces sexuality in the rotifer *Brachionus*

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ABSTRACT: Crowding induced the production of mictic (male-producing) females in *Brachionus calyciflorus* from two North American strains and an Australian strain. The specificity of this response to crowding was tested by culturing single individuals of a North American clone in three treatment conditions: a small volume (high density), a large volume (low density), and a large volume with a high density of an Australian clone. The results were consistent and clear in six experiments using different combinations of clones. Crowding low-density individuals of the North American strains with the Australian strain failed to induce them to produce mictic females. The mictic-female response in this treatment was similar to that in the low-density treatment, and both of these responses were significantly lower than that in the high-density treatment. Since the mictic-female response to crowding in *Brachionus* is mediated by a chemical produced by the rotifers themselves, the chemical inducers produced by the Australian and North American strains must be different. Taxonomically specific responses to crowding should increase fitness by assuring that sexual reproduction in the heterogonic life cycle coincides with a high population density of individuals able to mate with one another and, thus, when the production of fertilized resting eggs can be maximized. This would be especially important in plankton communities with diverse rotifer assemblages and multiple congeneric species. Otherwise, a low-density population of a species could be induced to initiate bisexual reproduction by populations of other species, curtailing its potential for population growth via female parthenogenesis and limiting its production of resting eggs in the future.

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