Parasites can affect their hosts in various ways, and this implies that parasites may act as additional biotic stressors in a multiple-stressor scenario, resembling conditions often found in the field if, for example, pollutants and parasites occur simultaneously. After briefly explaining their life cycles, we focus on parasite stages affecting selected ecotoxicologically relevant target species belonging to crustaceans, molluscs, and fish. We show that parasites from different taxonomic groups (e.g., Microsporidia, Monogenea, Trematoda, Cestoda, Acanthocephala, and Nematoda) clearly modulate the response to stressors in their hosts. In the present study, we introduce the most important groups of parasites occurring in organisms commonly used in ecotoxicological studies ranging from laboratory to field investigations. Therefore, parasites represent important modulators of host reactions in ecotoxicological studies when measuring the response of organisms to stressors such as pollutants.