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Mayflies may be more sensitive to aquatic contaminants than surrogate test organisms used to determine anthropogenic effects on aquatic ecosystems. While toxicity testing could be utilized to establish a direct link between contaminants of concern and mayfly mortality, potentially more sensitive mayfly taxa are not readily available for use in toxicity testing. Methods for rearing larval mayflies to emergence, collecting viable eggs and rearing them to hatch have been developed. Further development of the methods in order to conduct native mayfly toxicity testing is dependent on a suitable food source being established for cultured mayfly nymphs. The objective of this study was to find a suitable food source for newly hatched Baetidae nymphs to increase longevity of newly hatched nymphs. Success will be evidenced by the growth and development of the nymphs. Preliminary evaluations utilizing a variety of natural and laboratory cultured diets given to individual nymphs in separate chambers were conducted. Mortality and growth were used to narrow food types to the ones yielding the best results for further testing. Ten of the eleven feeding treatments maintained adequate survival of newly hatched mayflies for 3 days but only 2 of the treatments, the first being a mixture of diatoms collected from Hammack Hollow and *Selenastrum* sp., and the second being leaf disks, supported greater than 70% survival to 6 days. While mortality was high in all treatments between 6 and 9 days, diet combining *Selenastrum* sp., yeast, cereal leaves and trout chow (YCT), and leaf disk supported the greatest survival over the 24 day study.