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THE EFFECT OF LIGHT ON RATES OF CLONING OF THE SYMBIONT-BEARING ACOEL *CONVOLUTRILOBA LONGIFISSURA*

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The acoel turbellarian *Convolutriloba longifissura* reproduces primarily by asexual fission and engages in an obligate symbiotic relationship with unicellular algae belonging to the genus *Tetraselmis*. The obligate nature of the symbiosis between these species suggests that algal photosynthesis may influence rates of flatworm asexual reproduction. To test this hypothesis we explored the effect of light on *C. longifissura's* ability to clone. Worms (n=18/treatment) were incubated at light regimes of total darkness, 8L:16D, and 12L:12D for 30 days at 26 ± 1°C. Worms held in complete darkness experienced 100% mortality after 14 days; mortality in all other light treatments was <4%. Cloning increased with a greater exposure to light ($p=0.03$). The average rate of cloning for worms exposed to 8L:16D light cycle was 0.022/day; rates of cloning by individuals held at 12D:12L was nearly 3X greater (0.061/day). Flatworm length and cloning rate were positively correlated ($r=0.77$, $p=0.01$, $n=36$); there were no significant differences in worm length among light treatments ($p>0.05$). Differences were detected in the cloning rates of worms exposed to blue, red, green, or white light for 20 days at 26 ± 1°C. Cloning rates were highest for worms exposed to white light, lowest for worms exposed to green light, and intermediate for those exposed to red or blue light. These data provide evidence supporting the hypothesis that algal photosynthetic activity directly affects cloning by *C. longifissura*. We suggest that light conditions which promote photosynthesis in algae result in release of photosynthate to the flatworm and these materials fuel asexual reproduction. In turn, flatworms provide shelter and/or nutrients to the algae. This allows for the possibility of a mutualistic symbiotic relationship between *C. longifissura* and *Tetraselmis* sp.