

Reports of sexually reproducing forms of *Lumbriculus variegatus* and other oligochaetes from the *Lumbriculus* complex have been so limited that architomy is thought to be the major reproductive process in these annelids. As we have collected *Lumbriculus* from sloughs and lakes in Minnesota, Iowa, Wisconsin, and Montana, we found an abundance of specimens that were sexually reproducing. Morphology of sperm from worms collected at Gull Point State Park in Iowa and from Crystal Lake in Minnesota was studied. Sperm were filiform with total lengths of 99 and 95 microns for the MN and Iowa specimens, respectively. DAPI and MitoTracker Green FM staining showed that sperm mitochondria were localized posterior to an elongated nucleus that occupied most of the head region. Patterns of cleavage and gastrulation were determined by microscopy of fixed embryos that were stained with DAPI and Nile red. Similar patterns of development were observed in embryos from cocoons produced by MN and Iowa specimens of *Lumbriculus*. Cleavage was holoblastic and resulted initially in two cells of unequal size. The second cleavage gave rise to one large cell and three smaller cells of similar size. During the third cleavage, micromeres were generated asynchronously in a spiral pattern. In subsequent cleavages, extensive and rapid division of the micromeres occurred, while cleavage of the macromeres was slower and limited to a few divisions. The mechanism of gastrulation was primarily epiboly with an expanding sheet of micromeres eventually encompassing the macromeres. Our observations suggested that specification of cell fate occurs very early in embryonic development in *Lumbriculus* species.