

PREDATORY SCARS IN SHELLS OF THE RECENT LINGULIDE BRACHIOPOD  
*GLOTTIDIA PALMERI*: BEHAVIORAL, ECOLOGICAL AND ENVIRONMENTAL  
IMPLICATIONS

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The lingulide brachiopod *Glottidia palmeri*, Dall inhabits the macrotidal environments of northeastern Baja California (Mexico). This deep-infaunal suspension-feeder occurs in dense patches in the intertidal sand and mud flats. Its organo-phosphatic shell often bears a repair scar which records the unsuccessful attack by a predator.

We collected live samples from two localities in March 1993, November 1993, and February, 1994. All patches from locality 1 (N 31° 11.7', W 114° 53.2') were inhabited by a single age-class of large mature specimens (4-6 years old). Patches from locality 2 (N 31° 22.8', W 114° 51.4') were inhabited by much smaller (1-3 years old) brachiopods from two or more age classes. All live-collected shells (n=818) were analyzed for the presence of repair scars. We described the position of the scar, its shape, size, and repair-stage.

The scars are typically wedge-shaped disruptions of growth rings and color banding. Their size ranges from 1 to 10 mm. The shells often contain more than one repair scar. Typically, repair scars consist of two complementary disruptions located on opposite valves at about the same distance from shell's anterior edge. Such paired scars are most likely produced by the long beak of a predatory shorebird: willets (*Catastrophus semipalmatus*) and long-billed curlews (*Numenius americanus*) are the most likely perpetrators.

Among the 818 live specimens examined, 323 (39.5%) have repair scars. This suggests a very high rate of unsuccessful attacks. There is significant variation in the frequency of scars between the localities. Mature patches (locality 1) have a very high proportion of specimens with scars (up to 57.2 % per sample). The younger patches (locality 2) have much lower proportion (less than 10 %). This difference most likely reflects the accumulation of scars with the increase in age of the population.

Scars are not randomly distributed within the shells: two major modes occur. Each mode occurs near lighter growth bands in the shell (most likely secreted during the winter months). The non-uniform distribution of scars suggests that predation varies seasonally. The scars most likely record the seasonal migration of willets and/or curlews. These birds are migratory and winter in the Gulf of California.

Because repair scars can be preserved in fossil brachiopods, these results have important paleontological implications. The distribution of scars may offer information on the migratory behavior of ancient birds and on the seasonality of predation. Such information is very rarely available in paleontology. Finally, scars made by shorebirds indicate, beyond any doubt, that the brachiopods must have lived in the intertidal environment.