



**FIGURE 2**—Pagurized *Polinices* from central and southern California. **A**) Spionid trace fossil (arrow) in aperture notch of *Polinices reclusianus* (Deshayes 1839), Pleistocene, Palos Verdes Sand, San Pedro, LACMIP 7809 (UCLA loc. 2381), 23.2 mm shell height. **B**) *Polinices* with *Isocheles pilosus* (Holmes 1900); spionid trace fossil in aperture notch, Recent, Pajaro Dunes beach drift, Watsonville, shell height 39 mm. **C**) Spionid bore holes in outer lip of *Polinices reclusianus* (Deshayes), Pleistocene, above Upper Newport Bay, Orange Co., LACMIP 7810 (UCLA loc. 3195), shell height 33.7 mm. **D**) Spionid trace fossils on outer lip and encrusting bryozoan on columella of *P. reclusianus*, Pleistocene, above Upper Newport Bay, Orange Co., LACMIP 7811 (UCLA loc. 3195), shell height 28 mm.

Similarly, epifaunal hermit crabs are indicated by *Helicotaphrichmus* bore holes in the columella and spionid bore holes on the outer lip of the deep-water *Megasurcula carpenteriana* (Figs. 3A, 3B). Whereas, *M. carpenteriana* with singular spionid trace fossils above the aperture notch indicate a burrowing hermit crab (Fig. 3C). I have collected Recent *Megasurcula carpenteriana* inhabited by *Isocheles pilosus* from the shallow intertidal of San Pedro that also have this spionid bore hole (Fig. 3D). *Isocheles pilosus* does not have a reported

fossil record although this species is abundant in California, occurring in intertidal waters to depths of over 100 m (Morris et al., 1980).

Pagurized *Fusitriton oregonensis* can be recognized by columellar spionid bore holes (Fig. 4A), encrusting bryozoans (Fig. 4B, 4C), or encrusting bryozoan trace fossils (etchings) (Fig. 4D). These traces again indicate that an epifaunal hermit crab inhabited the shells.

Bionts provide important clues to determine if a shell had