

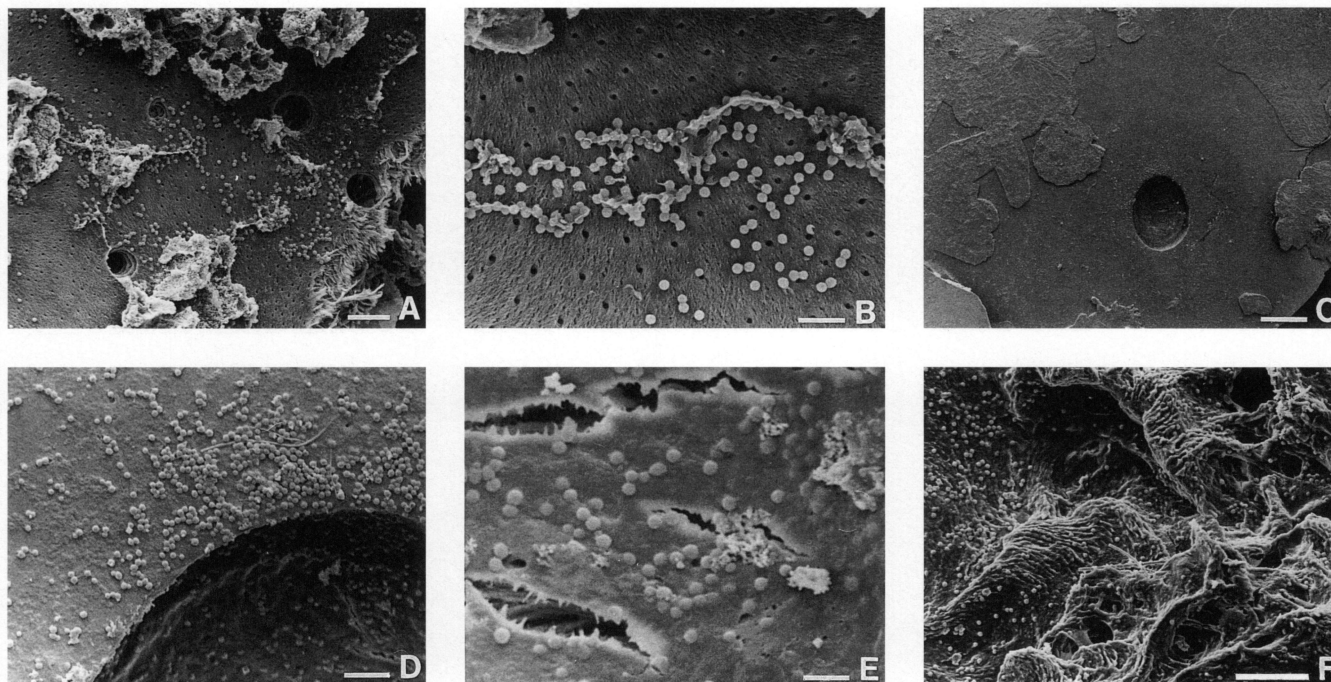


FIGURE 2—SEM illustrations of microbial activity after 8 weeks decay. (A) Bacteria decaying soft-tissue on the inner surface of the merus of a smashing limb. Scale bar is 10 μm . (B) Detail of (A) showing bacteria attached to soft-tissue fibers. Scale bar is 4 μm . (C) Bacterial degradation of the outer surface of the cuticle of an abdominal tergite, creating typical circular depression. The depression is surrounded by crystal crusts. Scale bar is 100 μm . (D) Detail of (C) showing concentrations of bacteria on cuticular surface around the depression. Scale bar is 10 μm . (E) Detail of (C) showing bacteria on the floor of the depression. Scale bar is 4 μm . (F) Fungal degradation, and bacteria, on the outer surface of one of the inflated carinae of the telson. Scale bar is 20 μm .

turned most of the appendages rigid. The raptorial limbs pointed obliquely downwards and unfolded, the propodus making an angle of about 90° with the merus (Fig. 1C). The intestines and body muscles were a slimy mass but still showed some coherence. One of the five carcasses became buoyant, the abdomen hanging down. All were still firm and remained intact when moved.

1 week.—The cuticle of the body turned transparent, females with a yellowish sheen, males with an orange sheen. The arthrodial membranes separating the last 4 thoracic tergites ruptured and those of the abdomen showed swelling, except that separating the last abdominal tergite and telson. The appendages were flexible, the walking limbs hanging down, the scaphocerites and pleopods loosely attached. The carapace became brittle. In some carcasses, the ventral side of the telson and the cuticle between the dorsal carinae became very soft and could be penetrated easily with a sharp object. Most of the carcasses lost their appendages when disturbed and the body divided, usually between the fifth and sixth thoracic tergites. The intestine and muscles were a fluid mass which lost its identity when the carcass was filtered.

2 weeks.—The arthrodial membrane between most of the tergites ruptured. The appendages remained loosely attached to the body. The cuticle was soft, except that of the propodus and dactylus of the raptorial limbs. The thinnest cuticle was destroyed by filtering; e.g., only the fringe of setae on the pleopods remained. Only the more sclerotized margins of the thoracic and abdominal tergites remained firm. On the external surface of the trunk cuticle, small circular indentations were evident (Fig. 2C). A striking

pattern of cuticle degradation was observed on the inner surface of the telson (Fig. 3D, E, F). The helicoidal structure of the microfibrillar layers of the endocuticle was exposed, revealing the typical spiralling pattern of microfibrils. Other degradation phenomena were developed on the inner surface of an abdominal sternite (Fig. 3I). The slightest disturbance resulted in fragmentation of the body tergites and separation of the appendages. The appendages themselves, however, remained largely intact. The intestine and muscles were clearly visible through the transparent cuticle, but they disintegrated when disturbed.

4 weeks.—The carcasses sampled at 4 weeks showed remarkable variation in the state of morphological decay. Two, both with a relatively high initial weight (see Appendix 1), remained dark in color and retained a more robust cuticle than the others, although the internal features had almost disappeared. The remaining carcasses all appeared virtually intact but disintegrated with the slightest movement. The heavy raptorial limbs dropped off as did most of the other appendages. The body divided, initially between the last thoracic tergites (Fig. 1D). In some cases, the sixth abdominal somite remained attached to the telson. In one carcass the carapace separated from the body and disarticulated into the three distinct longitudinal fields. In two carcasses, the cornea of the eyes fractured, releasing the dark pigment. The muscle and intestines disintegrated when disturbed.

8 weeks.—Although very fragile, the carcasses remained complete and intact. The muscles were clearly visible through the transparent cuticle. The carcasses only disin-