

**DR2009077**

**DATA REPOSITORY FIGURE CAPTIONS**

Figure DR1. Detailed measured section of the study locality from where the type specimens were collected (YPM D655; PRI Station 3421). Note presence of *P. eremita* at multiple horizons, two of which are illustrated in Figs. 1 and 2. The stratigraphic repetition and geographic spread of these traces at multiple localities and on multiple horizons minimizes the likelihood that *P. eremita* represents the activities of a single malformed individual, or population thereof. See Hagadorn et al. (2002) for a generalized stratigraphic column and locality map of the study region. Microbial structures in the section are described in Bottjer and Hagadorn (2007) and York et al. (2005), molluscan trace fossils are described in Yochelson and Fedonkin (1993) and Getty and Hagadorn (2008), subaerial exposure structures and arthropod trackways are described in MacNaughton et al. (2003), Hoxie (2005) and Hoxie and Hagadorn (2005) and soft-bodied arthropods are described in Hagadorn et al. (2003) and Collette and Hagadorn (2008).

Figure DR2. Field photograph of domal sand buildups, or ‘sand stromatolites’, from surface illustrated in Fig. 1. Head sizes increase in diameter toward the center of sand stromatolite clusters. Note that the *P. eremita* trackway at right has been overprinted by growth of sand stromatolite heads, whereas the trackway at lower left cross-cuts such heads. Scale bar is 10 cm.

Figure DR3. A: Photograph of a “typical” *Protichnites*, *P. septemnotatus* Owen 1852, illustrating the aligned medial impressions. Although the number and concentration of prints, as well as the presence/absence of a medial impression can vary with substrate or behavioral conditions, the orientation of the medial impression does not typically vary within *Protichnites* traces (Hoxie, 2005; MacNaughton and Hagadorn, 2007). B: For example, *P. septemnotatus* may exhibit a continuum of morphologic characteristics, in this case resulting from movement of the trackmaker from shallower to deeper water (top to bottom of slab). Regardless of trackway depth, sediment rheology, or substrate inclination, medial impressions in *P. septemnotatus* always remain parallel to the trace midline; in curved trackways, medial impressions are offset or shingled opposite the direction of turns. Specimen in A is from the same locality where *P. eremita* occurs and B is from the coeval Potsdam Group of Quebec. Both specimens are on bed soles (i.e., preserved in hyporelief), and photographed at the same scale; knife in B is 8.3 cm long.

Figure DR4. Field photographs of the holotype of *P. eremita* (Fig. 1; YPM 204961) from a top surface at 12.05 m in section (fig. S1). Reliefs appear opposite because the two heavy slabs were photographed separately with sunlight coming from the upper left in the left slab and from the lower right in the right one. The knife in both photographs is 8.3 cm long.

Figure DR5. Four small modern hermit crab trails overlapping a larger ghost crab trail in sands that are comparable in grain size to those from the Elk Mound Group. Note

intermittent shingling of shell marks, as well as continuous drag marks of shell along traces. Trails were produced in small aeolian dunes that are subjected to intermittent storm washover; trails are in dry carbonate sand which has not been bound by a biofilm. Photograph taken by A. Curran (Smith College) from Coast Guard Beach, San Salvador Island, Bahamas. Pen cap at lower left is ~6 cm long.

Figure DR1

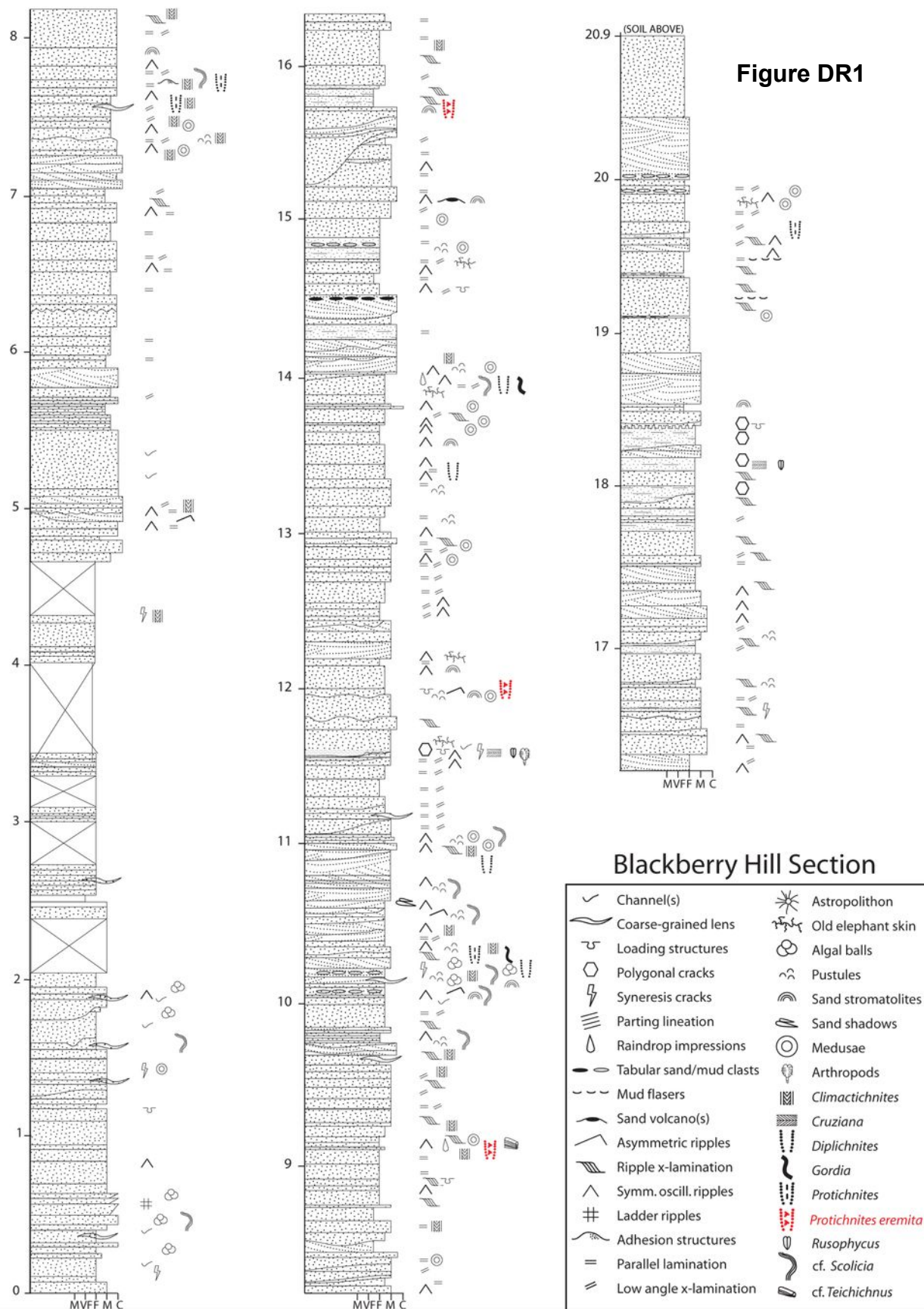




Figure DR2

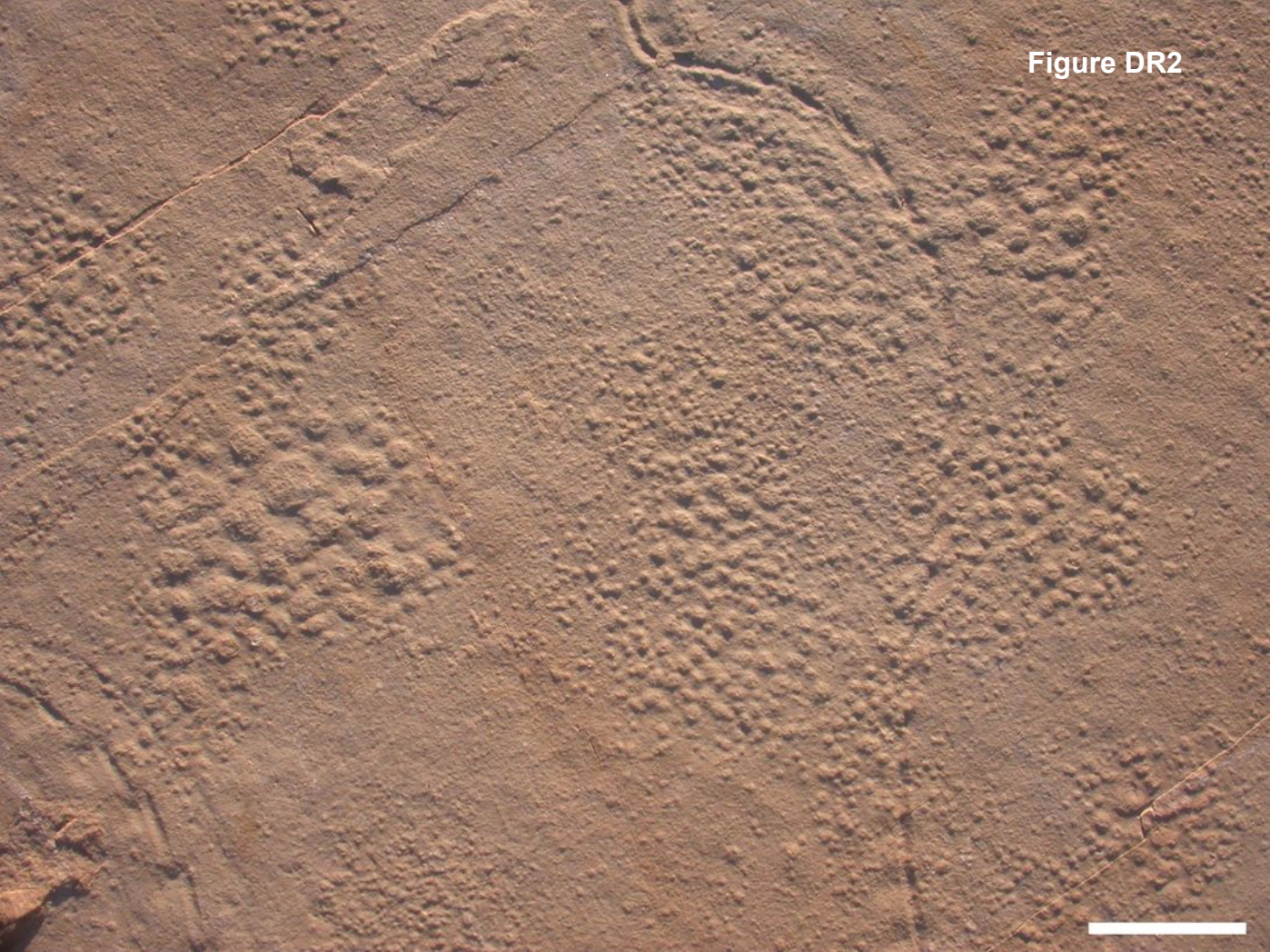
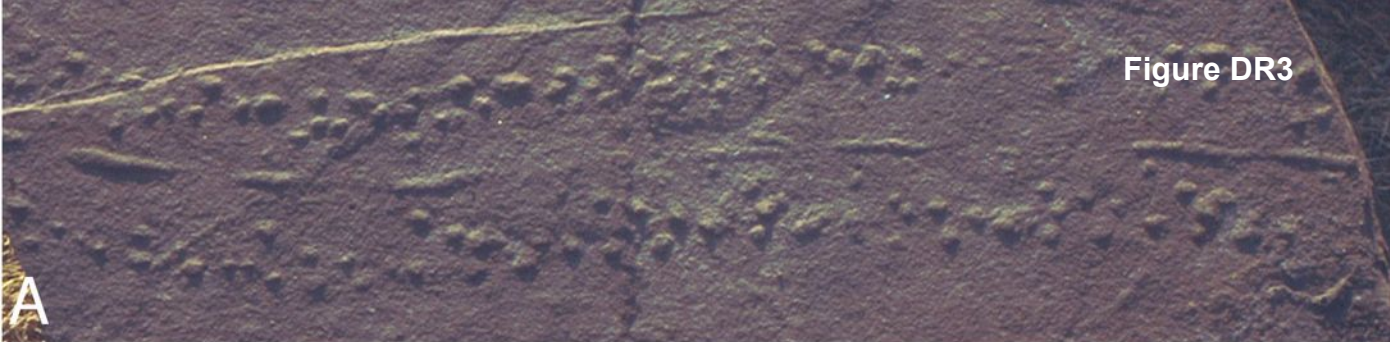




Figure DR3

A

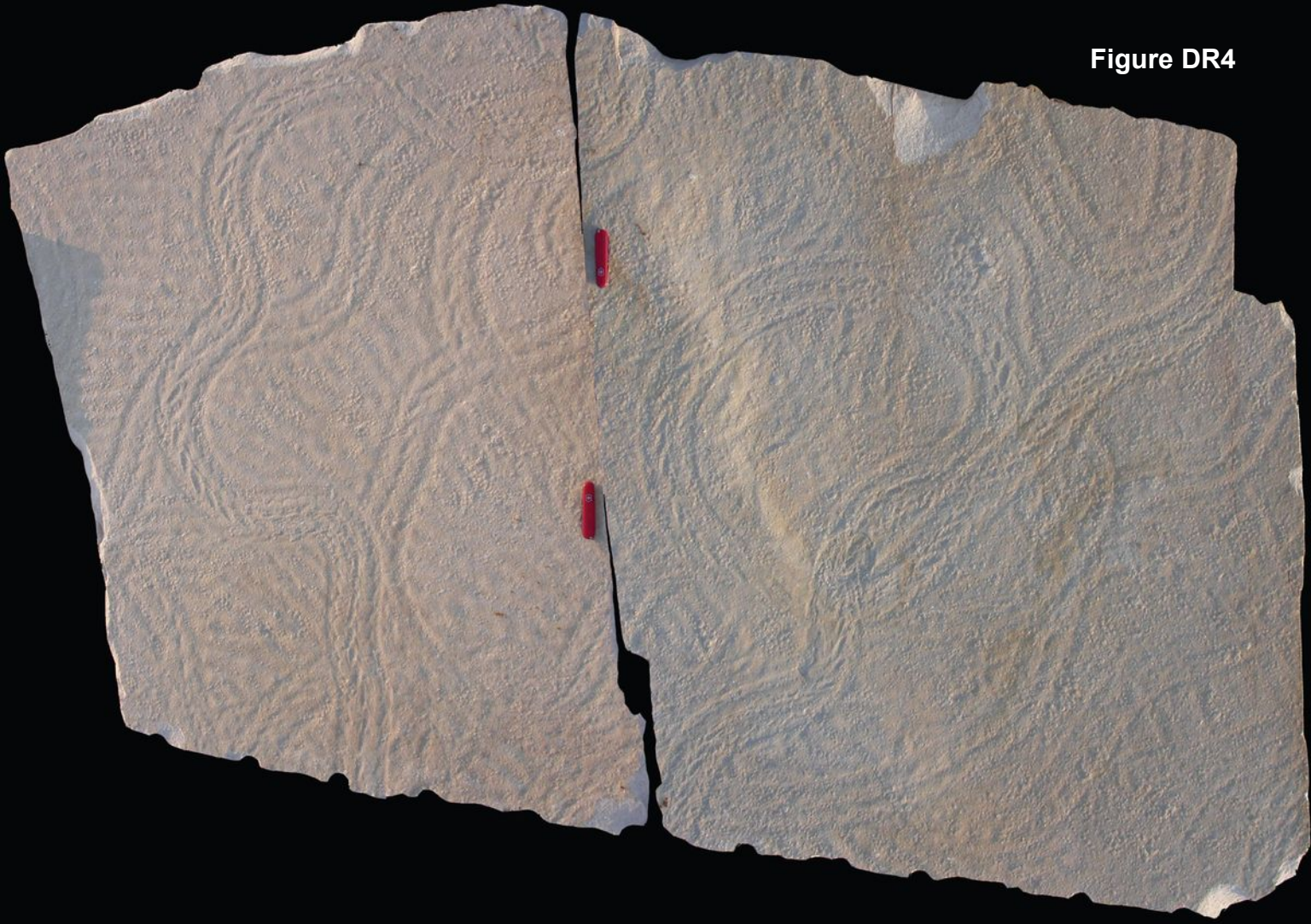


B





Figure DR4





**Figure DR5**

