



New sauropod tracks from the Lower Jurassic of Poland

Gerard GIERLIŃSKI, Gerard SAWICKI

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The second find of sauropod tracks from the Early Jurassic strata of Poland is reported. Sauropod trackway referred to the ichnogenus *Parabrontopodus* Lockley, Farlow, Meyer, 1994 has been discovered in the early Hettangian of Sołtyków, on northern slope of the Holy Cross Mountains.

Gerard Gierliński, Polish Geological Institute, Rakowiecka 4, 00-975 Warszawa, Poland; Gerard Sawicki, Educational Department, Channel One TVP S.A., Woronicza 17, 00-999 Warszawa, Poland (received: 25.11.1998; accepted: 1.12.1998).

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On November 14th, 1998, during a field trip with a team of the Educational Department of the Polish TV, Channel One, we have discovered and excavated a four-step sauropod trackway (Pl. I, Fig. 1). The trackway have been found in the southeastern part of Sołtyków outcrop, known also as the Odrowąż site. Footprints are imprinted atop a sandstone layer within the lower part of the exposed Sołtyków section, which represents early Hettangian fluvial plain deposits of the Zagaje Formation (G. Pieńkowski, G. Gierliński, 1987). The site already revealed large theropod tracks of *Kayentapus soltykovensis* (Gierliński, 1991) Gierliński, 1996, unpublished smaller theropod ichnite of *Grallator sensu* R. E. Weems, 1992, and small basal ornithischian footprint of *Anomoepus* Hitchcock, 1848 (G. Gierliński, 1995).

Following the tracks described from the Hettangian of Gromadzice (G. Gierliński, 1997), the newly discovered tracks in Sołtyków constitute a second ichnological record of the Early Jurassic sauropods in Poland. Sołtyków tracks are markedly larger than those of Gromadzice, whose pes lengths equal 24.5 and 30.5 cm. Pedal imprints of the new specimen reach a length of 42 cm and width of 32 cm. Manual imprints, being significantly smaller than the pedal ones, are approximately 12 cm long and 22 cm wide. Contrary to the incomplete Gromadzice trackway, that one from Sołtyków clearly shows the narrow-gauge pattern *sensu* J. O. Farlow, 1992 (Pl.

II, Fig. 2), which corresponds to the ichnogenus *Parabrontopodus* Lockley, Farlow, Meyer, 1994. The steps become shorter along the exposed stretch of the trackway. Ratio of pace length to pes length equals 1.60–3.46, ratio of stride length to pes length equals 3.00–5.10, and the pes pace angulation equals 121–152°. Ratio of pace length to manus length equals 7.50–9.67, ratio of stride length to manus length equals 11.03–15.17, and the manus pace angulation equals 92–119°.

Interestingly, there is no Early Jurassic sauropod record outside Africa and Eurasia. The current ichnological record is restricted to the Hettangian of Poland and northern Italy (M. Avanzini, 1997; M. Avanzini *et al.*, 1997; F. M. Dalla Vecchia, 1994; M. Lanzinger, G. Leonardi, 1991; G. Leonardi, M. Avanzini, 1994) and the Pliensbachian of Morocco (S. Ishigaki, 1988). The classic track-bearing Early Jurassic strata of the Newark Supergroup and the Glen Canyon Group in North America revealed track assemblages of *Kayentapus*, *Grallator* and *Anomoepus* (M. G. Lockley, A. P. Hunt, 1995; R. E. Weems, 1992), surprisingly similar to the Sołtyków assemblage, with the exception, however, of sauropod tracks. On the other side, contrary to the Liassic track assemblages of North America, no prosauropod footprints are reported in Poland.

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NOWE ŚLADY ZAUIPODÓW Z DOLNEJ JURY POLSKI

Streszczenie

W listopadzie 1998 r. autorzy wraz z ekipą Telewizji Edukacyjnej Telewizji Polskiej S.A. odkryli drugie w Polsce stanowisko ze śladami zauropodów (tabl. I, fig. 1). Trop złożony z czterech odcisków kończyn tylnych i przednich znajdował się na stropie ławicy piaskowcowej wchodzącej w skład dolnej części osadów formacji zagajskiej odsłoniętych w Sołtykowie (północne obrzeżenie Gór Świętokrzyskich). Osady te stanowią utwory równi zalewowej dolnego hettangu świętokrzyskiego (G. Pieńkowski, G. Gierliński, 1987).

Podobnie jak pierwsze odkryte w Polsce ślady zauropodów z hettangu Gromadzic (G. Gierliński, 1997), również omawiany okaz jest tropem wą-

skim (tabl. II, fig. 2). Typ taki określany jest ichnorodzajem *Parabrontopodus* Lockley, Farlow, Meyer, 1994.

W obliczu kolejnego europejskiego stanowiska z tropami wczesnojurajskich zauropodów, po Gromadzicach i północnych Włoszech (M. Avanzini, 1997; M. Avanzini i in., 1997; F. M. Dalla Vecchia, 1994; M. Lanzinger, G. Leonardi, 1991; G. Leonardi, M. Avanzini, 1994), zastanawia zupełny brak śladów w klasycznych troponośnych zespołach liasów północnoamerykańskiego. W liasie świętokrzyskim nie odnotowano natomiast prozauropodów, których tropy obecne są w dolnej jurze Ameryki Północnej (M. G. Lockley, A. P. Hunt, 1995).

EXPLANATIONS OF PLATES

PLATE I

PLATE II

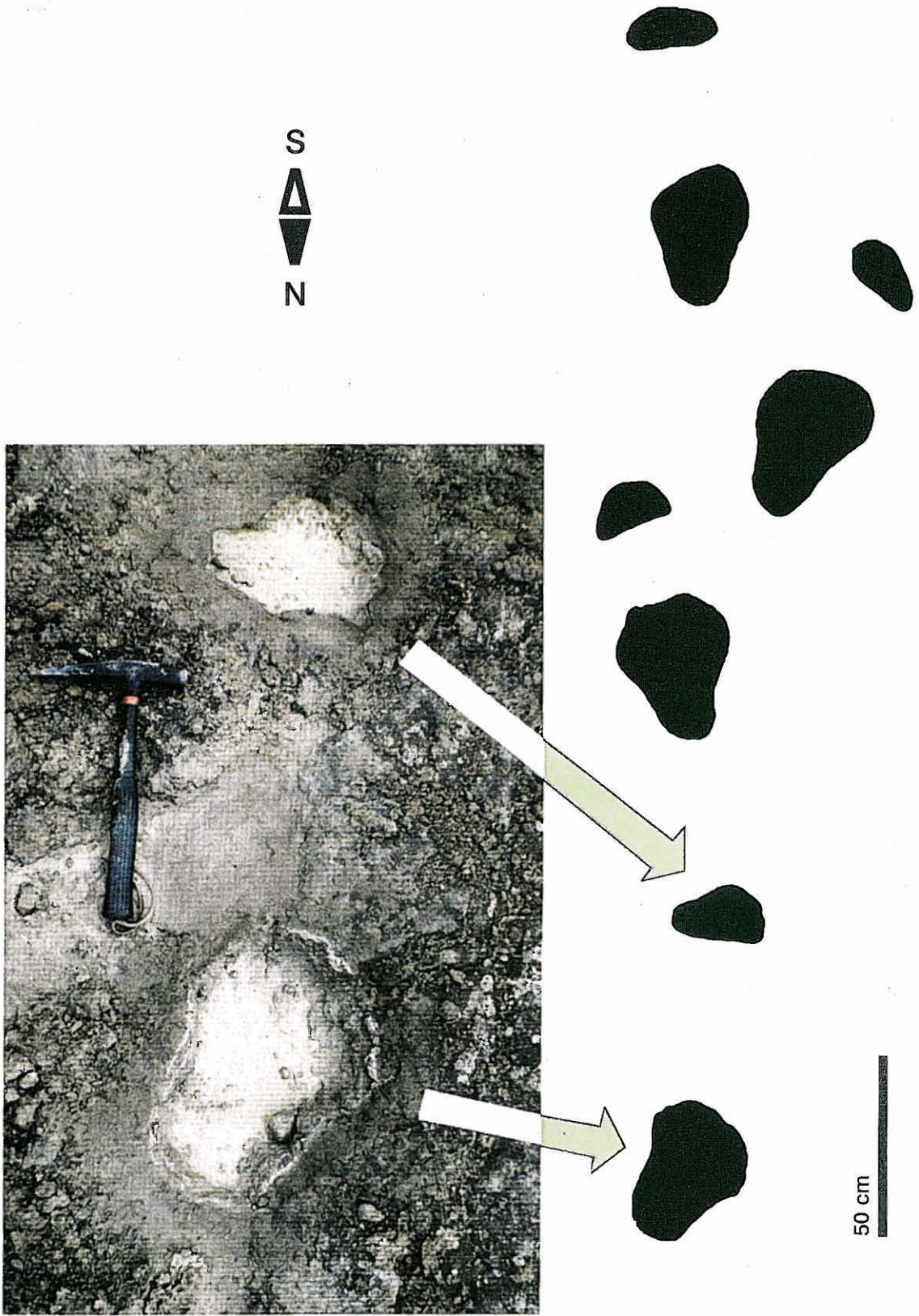
Fig. 1. Field photograph of sauropod trackway in the Sołtyków outcrop
Trop zauropoda w odsłonięciu Sołtyków

Fig. 2. Sauropod trackway (*Parabrontopodus* sp.) from the Lower Hettangian of Sołtyków

Trop zauropoda (*Parabrontopodus* sp.) z dolnego hettangu Sołtykowa



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