

## MORPHOLOGICAL VARIABILITY OF OOSPORES OF *CHARA BAUERI* A. BRAUN (CHARACEAE)

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### ABSTRACT

The shape and size of present-day specimens of *Chara baueri* are described. *C. baueri* is believed to have practically died out in Europe. Oospores of specimens of *C. baueri* collected in Kazakhstan were subjected to morphological analysis. Data recorded included oospore length, oospore diameter, the ratio of length to diameter, the number of lateral convolutions, ridge width, the width of the fossules at the equator, and the diameter of the basal pore. Variation in oospore length and the number of convolutions was higher than had been previously reported in the literature, whereas variation in oospore width was identical to previous reports.

KEY WORDS: *Chara baueri*, oospores, morphology.

### INTRODUCTION

*Chara baueri* Braun 1847 had been first collected from near Berlin by Bauer. In 1829, it was described by Reichenbach and given the designation *Chara scoparia* (Langangen and Sviridenko 1995; Blümel and Raabe 2004). *C. baueri* occurs sporadically in Europe (Braun 1876; Migula 1909; Kusber et al. 2004), Australia (Krause 1997) and Central Asia, in particular Kazakhstan (Langangen and Sviridenko 1995). *C. baueri* was regularly found in the Berlin area until 1869 (Krause 1997). In the twentieth century, *C. baueri* could still be found in other parts of Europe, including Italy (Wood and Imahori 1965), Austria (Ganterer 1847, cit after Langangen and Sviridenko 1995), Sweden (Blindow 2000) and southwestern Lithuania (Hollerbach and Krassavina 1983). It is believed that *C. baueri* has died out in Germany (Schmidt et al. 1996; Kusber et al. 2004), and is only very rarely, if ever, encountered in other European countries.

### MATERIAL AND METHODS

The specimens used in this study had been collected from a shallow temporary pool 10 km east of Petropavlosk in Kazakhstan (Langangen and Sviridenko 1995). The specimens were kindly provided by Dr. Anders Langangen of the Herbarium in Oslo, Norway. Only fifteen oospores were available for morphological analysis.

Measurements were carried out with the help of a stereomicroscope and image analyzer with a resolution of 1  $\mu\text{m}$ . Data recorded included longest polar axis of oospore (LPA), largest equatorial diameter (LED), isopolarity index (ISI = 100 LPA/LED), the number of convolutions,

ridge width, the width of the fossules at the equator, and the diameter of the basal pore.

### RESULTS AND DISCUSSION

The oospores examined in this study ranged from small to medium in size. They were similar in shape to the oospores of the group of *Chara* species which includes *C. globularis*, *C. delicatula* and *C. connivens*. This was particularly true as far as the shape of the apex was concerned. The measurements agreed well with the scanty data from identification keys and the original reports, although the variation in measurements was higher than could be concluded from literature.

Oospore length (LPA) in this study averaged 512  $\mu\text{m}$ , which is consistent with previously published data. Langangen and Sviridenko (1995) reported that oospore length averaged 500  $\mu\text{m}$ . The variation in oospore length (LPA) in this study was quite large, with values ranging from 436 to 574  $\mu\text{m}$ . This conflicts somewhat with earlier studies. Both Migula (1909) and Dąbska (1964) reported that there was little variation in oospore length, with values ranging from 500 to 550  $\mu\text{m}$ . On the other hand, Hollerbach and Krassavina (1983) reported that there was significantly more variation in oospore length, with values ranging from 500 to 720  $\mu\text{m}$ .

Oospore width (LED) in this study averaged 305  $\mu\text{m}$ , which is essentially the same as previously published data. Langangen and Sviridenko (1995) reported that oospore width averaged 300  $\mu\text{m}$ . Oospore width in this study ranged from 281 to 340, which agrees perfectly with earlier studies. Both Migula (1909) and Dąbska (1964) reported that oospore width ranged from 280 to 340  $\mu\text{m}$ .

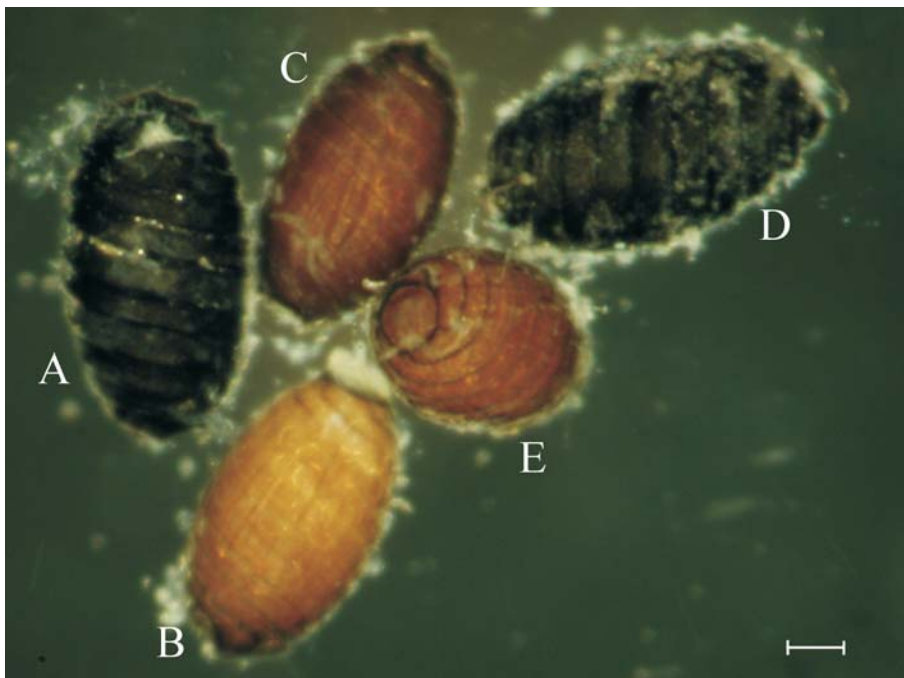


Fig. 1. Oospores of *Chara baueri* in lateral (A-D) and apical (E) view (Bar = 100  $\mu$ m).



Fig. 2. Oospores of *Chara baueri* in lateral (A-B) and basal (C) view (Bar = 100  $\mu$ m).

The oospores examined in this study had an narrow to wide ellipsoidal profile, with isopolarity index (ISI) ranging from 145 to 187 (Fig. 1). The apex ranged from slightly tapered to slightly flattened. No shoulder was seen, in contrast to the oospores of other *Chara* species.

Eight to eleven lateral convolutions were visible. The variation in the number of convolutions in this study was higher than in earlier studies. Migula (1909), Dąmbska (1964), Langangen and Sviridenko (1995) reported that eight convolutions were present. The ridges were unpronounced in very young oospores, and prominent in mature oospores. The fossules at the equator measured from 36 to 64  $\mu$ m in width, with most falling between 39 and 48  $\mu$ m. The basal pore was pentagonal and wide, with a diameter of about one-third the maximum equatorial diameter (Fig. 2). Color ranged from light brown in young oospores to

black in mature oospores. The membrane was either smooth or finely granulated.

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