Species identification based on morphological characteristics has caused misidentifications and led to twisted views of abundances and roles of ctenophores. Based on extensive field studies from 2007 to 2010, the occurrence of the arctic ctenophore Mertensia ovum was genetically verified in the southern, central and northern Baltic Sea, and its egg production, distribution and abundance were studied in relation to physical factors. Genetic analyses indicate that M. ovum is by far the most abundant small ctenophore in the Baltic Sea. Specimens from a 20 yr old ctenophore collection were also genetically identified as M. ovum, contrary to their previous morphological identification as another ctenophore species, Pleurobrachia pileus. Thus, earlier reports on P. pileus in the Baltic Sea may actually refer to M. ovum. The abundance of M. ovum was regulated by both salinity and temperature, with highest abundances found in sea areas and water layers at temperatures 5.5 and oxygen levels >4 ml l⁻¹. During summer, the highest abundances of ctenophores and their eggs were found near the halocline, while the distribution was more uniform throughout the water column during winter. Only ctenophores >3.5 mm (oral-aboral length) produced eggs in the experiments, with an average rate of 2.2 eggs ind⁻¹ d⁻¹. Finally, comparison with published data from the 1980s (assuming that those data refer to M. ovum) indicates that the present-day ctenophore abundance is ~80% lower in the north and ~55% higher in the southern parts of the Baltic Sea, due to reasons yet to be established.