STAGE BOUNDARY PROBLEMS IN THE EAST BALTIC DEVONIAN

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This paper concerns three Devonian stage boundaries: (1) Emsian/Eifelian, (2) Eifelian/ Givetian and (3) Givetian/Frasnian.

(1) In connection with the Emsian/Eifelian boundary the position of the Rezekne Regional Stage (R.S.) either in the Eifelian or in the Emsian has been the key problem. Based on the evolution of acanthodians during the Early and Middle Devonian, J. Valiukevičius in several papers concluded that the Rezekne R.S. belonged to the Eifelian, whereas Mark-Kurik (1991a), analyzing the fish faunas of above ages in general, considered this regional stage as a part of the Upper Emsian. Recently Valiukevičius (1995) also included the Rezekne R.S. into the Emsian. Still, a more detailed correlation of the Early/Middle Devonian boundary units in Baltic and Belarus is needed. According to Valiukevičius *et al.*, 1995, the Rezekne and Pärnu regional stages correspond to the Vitebsk and Ardov regional stages, i. e. to the *patulus* and *partitus* conodont zones and *D. inassueta* and *P. tortus* miospore zones, respectively.

Avkhimovitch *et al.* (1993) have shown that the lower parts of the Vitebsk R.S. are older. They contain spores of the *R. clandestinus* Zone. On the western slope of the Urals the same miospore assemblage comes from the Takata and Vyazovaya regional stages; the latter unit has revealed conodonts of the *serotinus* Zone. It would be interesting to know whether the Rezekne R.S. fully corresponds to the Vitebsk R.S. or whether the former unit has a smaller volume.

(2) Valiukevičius (1995) has correlated the uppermost part of the Narva R.S., the Kernave Regional Substage (R. Subs.), with the *kockelianus* Zone, the latest Eifelian conodont zone. The resemblance of the fish assemblages of the above unit and of the Achanarras Limestone in Scotland has been mentioned several times (Mark-Kurik, 1991b). The miospore assemblages of the Kernave R. Subs. (RL; Narbutas *et al.*, 1993) and the equivalents of the Achanarras Lmst (ADRef; Young, 1995) are quite comparable (Avkhimovitch *et al.*, 1993). House and Marshall (1993) have pointed out that the Achanarras Limestone should be correlated with the Kacác Event which took place at the end of the Eifelian (Becker and House, 1996). All these data indicate that the reasonable level for the Eifelian/Givetian boundary in the Baltic is between the Narva and Aruküla regional stages.

(3) The situation with the Givetian/Frasnian boundary is more complicated. As in the East Baltic sections conodonts are rare or absent in the boundary units, particularly in the Amata and Gauja regional stages, the correlation with the Timan region has been used for establishing the approximate position of the boundary (Sorokin, 1992). The Timan sections have yielded both conodonts and fishes which are rather similar to those from the East Baltic. The Ust-Yarega Fm. (S Timan) containing the fishes of the *cellulosa* Zone and the conodonts *A. rotundiloba* and *A. binodosa* can roughly be correlated with the Plavinas R.S.; the underlying Timan Fm. has also yielded *A. binodosa* (Kuzmin, 1995). According to Kuzmin (1995) and Ivanov (1995) the Givetian/Frasnian boundary falls within the Timan Fm. The fish assemblage of this formation (Ivanov, 1995) seems to be close to that of the Amata R.S. *Bothriolepis cellulosa* and *Psammosteus maeandrinus* are lacking and instead of them *Bothriolepis* sp. and *P. praecursor* occur. The data from Belgium (Blieck *et al.*, 1988) show that *A. binodosa* and *Rhinodipterus* cf. *secans* do not necesserily indicate the Frasnian age. The occurrence of several ptyctodonts (*Ctenurella, Rhynchodus*) in the Timan Fm. can be caused by facies differences.

Special attention should be paid to the Gauja R.S. that has been correlated with the lower part of the Timan Fm. (Sorokin, 1992). In Latvia the former unit includes the Abava Fm., an important level for the interregional correlation (Mark-Kurik, 1991b). In Estonia this unit is considered in the rank of regional substage and is included into the Burtnieki R.S., Givetian.

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