clear lithological change at the lower boundary of the Vormsi Stage at 104.0 m (Appendix 6, sheet 2) is not reflected in the chitinozoan distribution in the Männamaa (F–367) core. Higher, based on the appearance of *Spinachitina coronata* (Eisenack), the Kõrgessaare beds can be subdivided into two parts as in the Lelle (D-102) core (Hints *et al.* 2007), but the appearance level of the zonal species *Tanuchitina bergstroemi* Laufeld and the total range of *Acanthochitina barbata* Eisenack are biostratigraphically more important. However, in the Männamaa core the former species appears exceptionally at a higher level than in some earlier investigated sections (see Nõlvak & Grahn 1993; Hints *et al.* 2007). The disappearance of *A. barbata* marks the top of the Vormsi Age beds, mostly coinciding with a sharp decrease in the clay content of limestones, but without any discontinuity surfaces.

The Moe and Adila formations have very poor intervals and chitinozoan assemblages are markedly scantier than in the lower beds (Appendix 6, sheet 1). The faunal change is clear near the upper boundary of the Moe Formation, below which many long-ranging species disappear (e.g. *Belonechitina*, *Lagenochitina*). The upper half of the Pirgu Stage is rich in discontinuity surfaces (about 18) and clearly condensed. This part needs much more detailed research than done in this review. Thus, zonation is somewhat uncertain. The zonal *Conochitina rugata* Nõlvak was found in only one sample, leaving zone boundaries open, and other zones, such as *Tanuchitina anticostiensis* Achab and *Belonechitina gamachiana* Achab (Hints *et al.* 2005; Nõlvak *et al.* 2006), were not recorded. The large pentamerid brachiopod *Holorhynchus giganteus* Kiaer (*det.* L. Hints) of Pirgu Age (Brenchley *et al.* 1997), one of the key elements among late Ordovician macrofaunas, was found at a depth of 54.1 m.

The *Conochitina taugourdeaui* Zone (Appendix 6, sheet 1) is distinct and well developed. This chitinozoan species is important in timing Hirnantian glaciation events (Brenchley *et al.* 2003; Kaljo *et al.* 2008). The base of the biozone marks the base of the Hirnantian Global Stage in many localities, which, however, is defined by the occurrence of the graptolite *Normalograptus extraordinarius* not found in the East Baltic (for a recent review see Kaljo *et al.* 2008). As usual, the biohermal limestones of the Tõrevere Member are barren of chitinozoans.

According to the samples available from the Männamaa (F–367) section, the older part of the Silurian with the *Ancyrochitina laevaensis* Zone seems to be absent. The basal part is very similar to higher levels of the Varbola Formation, e.g. in the Põltsamaa core (Interzone I in Nestor *et al.* 2003, fig. 3). It is interesting to note that a layer very similar to the *Borealis borealis* coquina lies at a depth of 37.6–37.9 m, which seems to be older than in many other sections.

In general, the changes in the chitinozoan succession of the Männamaa (F–367) section conform relatively well to the boundaries of most Middle and Upper Ordovician stratigraphical units, often marked with hiatuses.

DISTRIBUTION OF CAMBRIAN, ORDOVICIAN AND LOWERMOST SILURIAN ACRITARCHS

Five samples from the Lower Cambrian and Furongian (Upper Cambrian), 112 samples from the Ordovician and 14 samples from the lowermost Silurian part of the Männamaa (F–367) core were studied for acritarchs (Fig. 7; Appendix 7, 8). A filtering preparation method enabling the examination of slides under light microscope, described by Vidal (1988), was used. Samples were prepared in the laboratory of the Geological Survey of Finland, Otaniemi, and preparates are stored in the Geological Museum, University of Helsinki.

The well-preserved Männamaa (F–367) material is represented by 17 Cambrian, 72 Ordovician and 10 Silurian genera comprising a total of 276 species (Fig. 7; Appendix 7, 8): 15 Lower Cambrian, 8 Furongian and 252 Ordovician and Silurian species. Thirty species are long-ranging, with a lesser dating value (12%). Only two new species appear in the Silurian limestones (Fig. 8, Appendix 7). As many as 227 species (82%) have been identified already in the Rapla core in Estonia (NW part of the East European Platform; Uutela & Tynni 1991), while 25 species are known only from the Männamaa section. The distribution of biostratigraphically important taxa is given in Appendix 8, and in Figs 7 and 8.

The taxonomic nomenclature of the Männamaa (F–367) material follows the one used for the Rapla core (Uutela & Tynni 1991; Kaljo *et al.* 1996), although Sarjeant & Stancliffe (1994, 1996), Sarjeant & Vavrdová (1997), and Mullins (2007) proposed the assignment of some species to other genera (see Appendix 9). The acritarch distribution is restricted to the Baltic area only.

Compared to the Rapla core (Uutela & Tynni 1991), the most significant feature is the lesser number of small species. Acritarch assemblages seem to be more important than individual species to indicate differ-

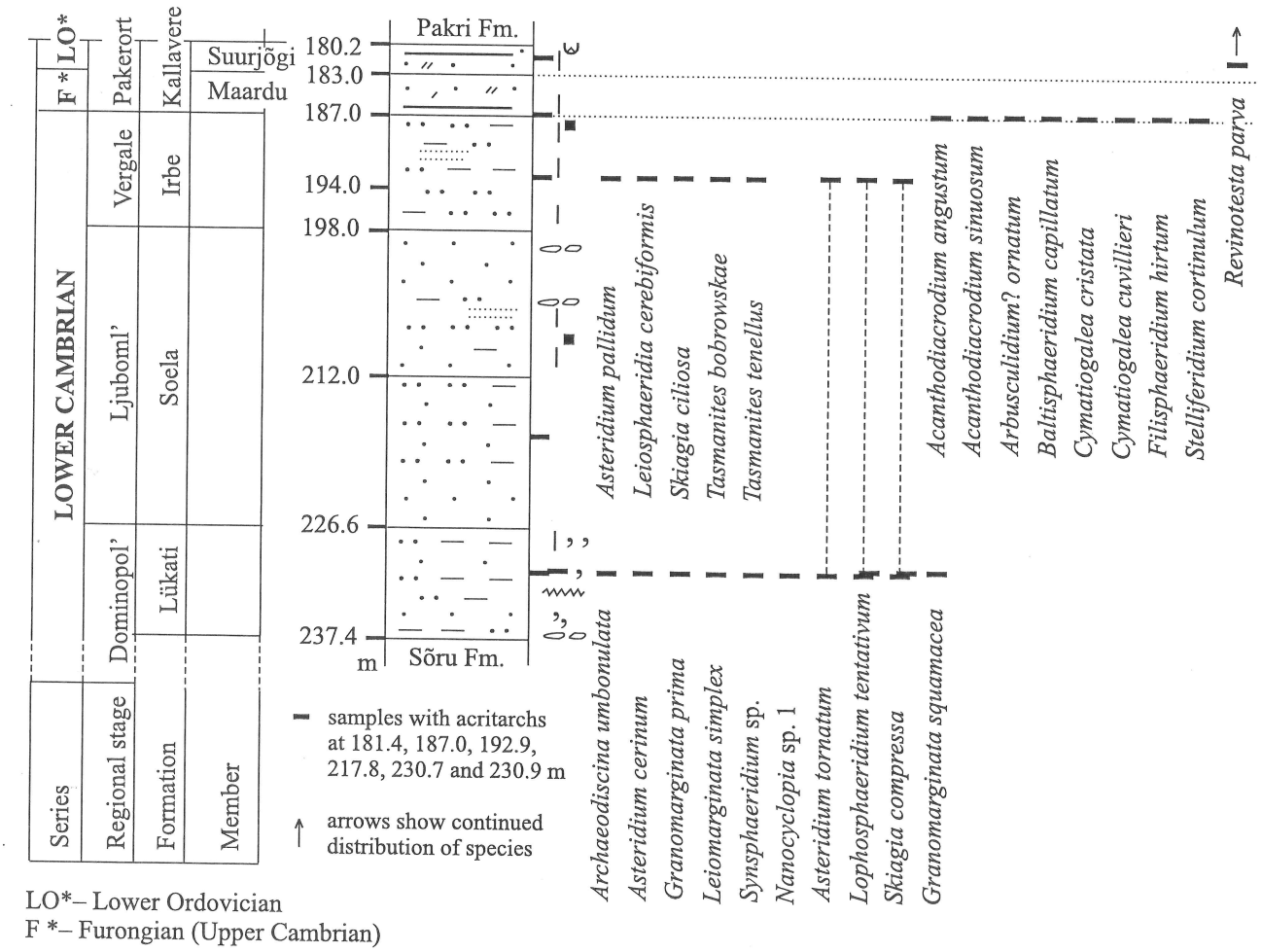


Fig. 7. Lower Cambrian and Lower Ordovician acritarchs of the Männamaa (F–367) core. Refer to Appendix 1 for key and to Appendix 9 for full names of the taxa.

ent stages. Additional acritarch studies from the Estonian area are needed to identify key assemblages for regional stages.

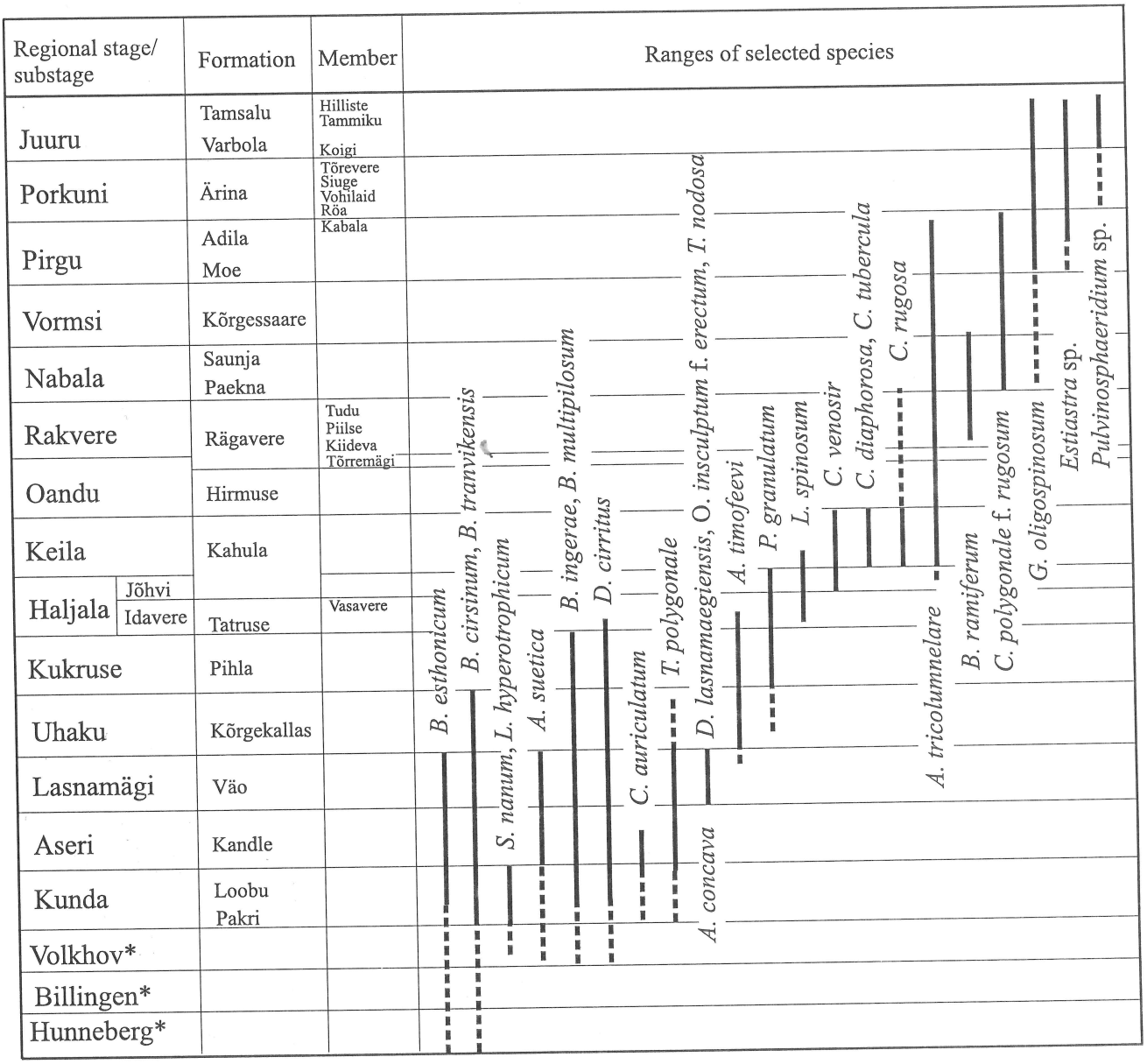
Only the upper part of **Lower Cambrian** silt- and sandstones was sampled for acritarchs (Fig. 7; Appendix 1, sheets 8–10). Ten species were identified in the **Dominopol' Stage** (Lükati Formation, 226.60–237.40 m; two samples). The only sample from the **Ljuboml' Stage** (Soela Formation, 198.0–226.60 m) was barren. The assemblage of the **Vergale Stage** (Irbe Formation, 187.00–198.00 m; one sample) contained eight species.

A rather poor **Lower Cambrian** assemblages of the Männamaa (F–367) section consists of long-ranging species typical of the Baltic area (Mens & Pirrus 1977; Volkova *et al.* 1983; Hagenfeldt 1989; Paalits 1995; Jankauskas 2002). *Lophosphaeridium tentativum* and *Asteridium tornatum* are more common in the Lükati Formation of the Dominopol' Stage, while the genera *Skiagia* and *Tasmanites* appear later in the Irbe Formation of the Vergale Stage (Fig. 7).

The **Furongian** sandstone is represented by the lower part of the **Pakerort Stage** (Maardu Member of the Kallavere Formation, 183.00–187.00 m; one sample). The sample yielded eight acritarch species (Fig. 7), including representatives of the oldest (*Stelliferidium* and *Cymatiogalea*) and youngest (*Acanthodiacrodium*) genera (Mens & Pirrus 1997). The genera *Acanthodiacrodium*, *Cymatiogalea* and *Dasydiacrodium* are also known from the Maardu Member (Kallavere Formation) of the Mäekalda section (Mens *et al.* 1989).

Only one specimen of *Revinotesta parva* was found from **Lower Ordovician** sandstones of the Pakerort Stage (Suurjõgi Member of the Kallavere Formation, 180.20–183.00 m; one sample) (Fig. 7). Its range reaches up to the Oandu Stage (Upper Ordovician; Appendix 8).

All younger Lower Ordovician rocks known from eastern and southern Estonian sections are missing in the surroundings of the Männamaa (F–367) section due to the erosional hiatus (see Nõlvak 1997).



Note: Rocks of the Varangu, Hunneberg, Billingen and Volkhov stages are missing in the Männamaa (F–367) section due to the erosional hiatus. In the Rapla core the Pakri Formation is replaced by the upper part of the Sillaoru Formation

Fig. 8. Distribution of selected Ordovician and Silurian acritarchs in the Männamaa (F–367) core (solid line), supplemented with data (dashed line) from Lithuanian (Paškevičienė 2003), Swedish (Hagenfeldt 1995) and Estonian (Rapla core; Uutela & Tynni 1991) sections.

Middle Ordovician limestones of the Männamaa (F–367) core comprise 168 acritarch species (Appendix 7). All productive samples yielded a rich assemblage of microfossils including well-preserved acritarchs.

The **Kunda Stage** (interval 177.80–180.20 m; three samples) is represented by the Pakri and Loobu formations in the Männamaa (F–367) core (Appendix 8). Sandy limestones (containing argillite pebbles) of the Pakri Formation occur in a limited area in northwestern Estonia west of Tallinn and are eastward replaced by the upper part of the Sillaoru Formation and the Loobu Formation (Meidla 1997). Two successive (from below) Sillaoru and Loobu formations are distinguished in the Kunda Stage in the Rapla core (Uutela & Tynni 1991).

Nine acritarch species appear in the Pakri Formation in the Männamaa (F–367) core (Appendix 7). The acritarch assemblage changes gradually in the Loobu Formation and is represented by 89 species typical of the Baltic area, with 34 species having a long range. Thirty-nine species, among them *Baltisphaeridium brevispinosum*, *B. cirsinum*, *B. esthonicum*, *B. ingerae*, *B. multipilosum*, *B. tranvikensis*, *Baltisphaeridium* sp. and *Dasydorus cirritus*, appear in the Rapla core already in the Volkhov Stage (Fig. 8; Uutela & Tynni 1991). The same situation is registered in Lithuanian sections (Paškevičienė 1999).

The range of *Baltisphaeridium anneliae* (Appendix 8) extends from the lowermost part of the Kunda Stage to the Kukruse Stage in the Rapla core (Uutela & Tynni 1991) and in the Dalby Limestone in Gotland (Górka 1987), but much higher up to the Oandu Stage in the Lithuanian sections (Paškevičienė 2001). *Baltisphaeridium flexuosum* known from the Kunda to Kukruse stages in the Rapla core (Uutela & Tynni 1991) appears in Lithuanian sections in the Volhkov Stage and is continuously present up to some levels in the Oandu and Rakvere stages (Paškevičienė 2001, 2003). *Solisphaeridium nanum* is found in the Männamaa (F–367) core only in the Kunda Stage like in the Rapla core (Uutela & Tynni 1991), but in Lithuanian sections appears earlier in the Volkhov Stage (Paškevičienė 2001). The appearance of *Goniosphaeridium mochtiensis* in the Loobu Formation coincides with Rapla data, but *Baltisphaeridium magnoporatum, Liliosphaeridium hyperotrophium* and *Peteinosphaeridium micranthum* have not been identified from the Rapla section (Uutela & Tynni 1991).

Liliosphaeridium hyperotrophium has been recorded in Lithuanian sections in the Volkhov (Paškevičienė 1998, 1999), Kunda and Lasnamägi stages (Paškevičienė 2003). *Baltisphaeridium magnoporatum* is known from the lower level of the Uhaku Stage in Grötlingbo core No. 1 (Kjellström 1971a) and Dalby Limestone in Gotland (Górka 1987), but also in the Oandu and Rakvere stages in Lithuania (Paškevičienė 2001). *Peteinosphaeridium micranthum* is found in the Volkhov and Kunda (Paškevičienė 1999), Lasnamägi and Uhaku (Paškevičienė 2002), and Oandu and Rakvere (Paškevičienė 2001) stages in Lithuania.

Thick-walled *Pachysphaeridium*-species (Appendix 7) have been identified in the Männamaa (F–367) core from the Kunda to Uhaku stages, in Lithuanian sections from the Volkhov to Uhaku stages (Paškevičienė 1999, 2002, 2003).

In the Rapla core *Baltisphaeridium verrucatum, Cycloposphaeridium auriculatum* and *Tranvikium polygonale* appear in the Sillaoru Formation (Uutela & Tynni 1991). The range of *C. auriculatum* in the Männamaa (F–367) section (Fig. 8; Appendix 8) is the same as in Lithuanian sections (Paškevičienė 1999). *Baltisphaeridium verrucatum* has previously been recorded in the level of the Lasnamägi Stage in Sweden (Kjellström 1971b) and in the Dalby Limestone in Gotland (Górka 1987). *Stelliferidium stelligerum* has not been found in the Rapla section, but in Lithuania it is recognized in the Uhaku Stage (Paškevičienė 2002).

The **Aseri Stage** (Kandle Formation, 177.00–177.80 m; three samples) is represented by 88 acritarch species, among these 43 long-ranging and 19 new species (Appendix 7). One of the new species is *Baltisphaeridium filosum* (Appendix 8), which appears in the Volkhov Stage in the Rapla core (Uutela & Tynni 1991) and in the Kunda Stage in Lithuanian sections (Paškevičienė 1999). *Ampululla suetica* (Appendix 8) is not found in the Rapla section (Uutela & Tynni 1991), but occurs in the level of the Volkhov and Kunda stages in Lithuanian sections (Paškevičienė 1998, 1999, 2002), as well as in Sweden (Righi 1991). *Liliosphaeridium kaljoi* has been identified in the Männamaa (F–367) section only in the Aseri Stage (Appendix 8), while in the Rapla core it ranges continuously from the Volkhov Stage to the Kunda Stage (Uutela & Tynni 1991), as in Lithuanian sections (Paškevičienė 1999). In the Männamaa (F–367) core *Polyancistrodorus phylloides* is present only in the Aseri Stage, but in the Rapla core also in the Lasnamägi Stage (Uutela & Tynni 1991). *Cycloposphaeridium auriculatum* disappears at the same level in the Männamaa (F–367) and Rapla sections. No dominant species are known from the Aseri Stage.

The **Lasnamägi Stage** (Väo Formation, 170.00–177.00 m; 12 samples) yielded the richest Middle Ordovician assemblage with 128 species, including 42 new species (Appendix 7). Similarly to the Rapla core (Uutela & Tynni 1991) *Arkonia concava, Dactylofusa lasnamaegiensis, Orthosphaeridium insculptum* f. *erectum* and *Timofeevia nodosa* were identified only in the Lasnamägi Stage (Fig. 8; Appendix 8). The most numerous species ranging throughout the stage are *Baltisphaeridium anneliae, B. flexuosum, B. ingerae, B. microspinosum, B. multipilosum, B. tranvikensis, Ordovicidium groetlingboensis, O. heteromorphicum* and *O. nudum*. Similar blooming of the genera *Baltisphaeridium* and *Ordovicidium* occurred in the Lasnamägi Stage in the Rapla core (Uutela & Tynni 1991) and other Baltic sections (Umnova 1975), as well as in the southeastern Baltic region (Paškevičienė 2002). Thick-walled species *Goniosphaeridium mochtiensis* and *Costatilobus bulbosus* are also common in the Männamaa (F–367) core (Appendix 7). Similarly to the Rapla core, *Tranvikium polygonale* and *Goniosphaeridium mochtiensis* disappear in the Lasnamägi Stage (Uutela & Tynni 1991), as well as *Ampululla suetica*, but in Lithuanian sections *G. mochtiensis* and *T. polygonale* have been recorded also from the Uhaku Stage (Paškevičienė 2002).

The **Uhaku Stage** (Kõrgekallas Formation, 168.40–170.00 m; five samples) in the Männamaa (F–367) core is represented by a rich acritarch assemblage of 114 species, including 19 new species (Appendix 7), among others *Axisphaeridium timofeevi, Ordovicidium groetlingboensis* f. *clavatum* and *B. constrictum* (Appendix 8). The last one is not present in the Rapla

core (Uutela & Tynni 1991), but is found in Sweden in the Folkeslunda and Furudal sections (Kjellström 1971a, 1972, 1976). *Baltisphaeridium anneliae*, *B. ingerae*, *B. microspinosum*, *B. multipilosum*, *Ordovicidium groetlingboense*, *O. heteromorphicum* and *O. nudum* are still common (Appendix 8). Thirteen acritarch species disappear before and during the Uhaku Age. The most important of those are *Baltisphaeridium cirsinum* and *B. tranvikensis* (Appendix 7, 8), like in the Rapla core (Uutela & Tynni 1991).

In the **Upper Ordovician** the acritarch assemblage of the Männamaa (F–367) core changes gradually (Fig. 8; Appendix 7, 8). From the **Kukruse Stage** (Pihla Formation, 165.20–168.40 m; seven samples) 107 species have been identified (Appendix 7). Eight species appear in the Kukruse Stage. The most important new species is *Peteinosphaeridium breviradiatum*, which has been recorded from Lithuanian sections in the Latorp (=Hunneberg) Stage (Paškevičienė 1998), and from Folkeslunda beds (on the level of the lower part of the Uhaku Stage) in Gotland (Kjellström 1971a) and Dalby Limestone (Górka 1987). *Baltisphaeridium anneliae*, *B. microspinosum*, *Ordovicidium groetlingboense* and *O. nudum* are still common (Appendix 8). Nine species disappear, among others *Baltisphaeridium accinctum*, *B. anneliae*, *B. filosum*, *B. ingerae*, *B. magnoporatum* and *B. multipilosum*. In Lithuania, *B. anneliae* and *B. brevispinosum* have been recorded later in the Oandu Stage, *B. accinctum*, *B. magnoporatum* and *B. multipilosum* even in the Rakvere Stage (Paškevičienė 2001).

The base of the **Haljala Stage** (**Idavere Substage**; Tatruse Formation, 160.20–165.20 m; 11 samples) is represented by 124 acritarch species, 17 of which are new (Appendix 7). Similarly to the Rapla core, the first appearance of *Lacunosphaeridium spinosum* in the Männamaa (F–367) section is registered (Fig. 8; Appendix 8; Uutela & Tynni 1991). Species of the genera *Baltisphaeridium* and *Ordovicidium* are less numerous than previously, although *Baltisphaeridium hirsutoides*, *B. microspinosum*, *B. nanninum*, *B. parvigranosum* and *B. pauciverrucosum* are still common, as well as *Ordovicidium groetlingboense*, *O. eleganthulum* and *O. nudum*. Numerous *Multiplicisphaeridium*-species appear (Appendix 7). Six species disappear: *Aremoricanium deflandrei*, *Axisphaeridium timofeevi*, *Dasydorus cirritus*, *Polyancistrodorus bryoides*, *Dasydorus* sp. 1 and *Micrhystridium inconspicuum aremoricanium*.

The upper part of the **Idavere Substage** (Vasavere Member of the Kahula Formation, 158.60–160.20 m; three samples) differs from the lower part (Tatruse Formation) in a smaller number (83) of species (Appendix 7). The *Baltisphaeridium* and *Ordovicidium* species common in the Tatruse Formation are present in the Vasavere Member. No new species appear in this part of the substage but *Baltisphaeridium flexuosum*, *Costatilobus bulbosus*, *Dilatisphaera nanofurcata* and *Polyancistrodorus magnispinosus* disappear (Appendix 8).

The **Jõhvi Substage** of the **Haljala Stage** (157.30–158.60 m; three samples) is represented by 87 species (Appendix 7). Only the lowermost sample is rich in acritarchs. Five species appear in this stage, among others *Cheleutochroa venosa* and *Gorgonisphaeridium frequens* (Appendix 8). The latter has not been identified in the Rapla core (Uutela & Tynni 1991), but in Sweden it is found in the Dalby Limestone (Górka 1987). *Multiplicisphaeridium lichenoides* and *Peteinosphaeridium granulatum* disappear during Jõhvi time (Fig. 8; Appendix 8).

The richest acritarch sample in the Männamaa (F–367) section comes from the level of 156.8–156.9 m of the **Keila Stage** (Kahula Formation, 141.00–157.30 m; eight samples). A total of 132 species have been found in the Keila Stage, whereas 28 species appear for the first time (Appendix 7). Like in the Rapla section (Uutela & Tynni 1991), 16 species have been identified only in the Keila Stage, among others *Arkonia semigranulata*, *Cheleutochroa diaphorosa*, *C. rugosa*, *C. tubercula*, *Costatilobus*? *trifidus*, *Cymatiosphaera latimurata*, *Orthosphaeridium* sp., *Veryhachium asymmetrospinosum* and *Vulcanisphaera minor*.

In Lithuania *A. semigranulata* is also known in the Lasnamägi and Uhaku stages (Paškevičienė 2002). *Cheleutochroa rugosa* and *C. venosa* have been recorded also in the Oandu and Rakvere stages in Lithuania (Paškevičienė 2001). Thirty-eight species disappear during Keila Age, e.g. *Cheleutochroa venosior*, *Multiplicisphaeridium* aff. *palmitella*, *Ordovicidium groetlingboensis* f. *clavatum*, *Orthosphaeridium latispinosum* and *Polygonium delicatum* (Fig. 8; Appendix 8). *Veryhachium*-species are the most common in the Keila Stage of the Männamaa (F–367) section.

The Hirmuse Formation of the **Oandu Stage** (interval 138.80–141.00 m; three samples) yielded 40 species (Appendix 7). Samples are poor in acritarchs. *Baltisphaeridium onniense* and *Micrhystridium* sp. 1 appear in the Hirmuse Formation (Appendix 8), while *Multiplicisphaeridium gotlandicum* disappears earlier than in the Rapla core (Uutela & Tynni 1991). The Tõrremägi Member (138.20–138.80 m; one sample) of the Rägavere Formation in the upper part of the Oandu Stage contains a poor assemblage of 29 acritarch species (Appendix 7). Two probably new species *Baltisphaeridium* sp. 1 and *Baltisphaeridium* sp. 2 are found.

Leiosphaeridia keilaensis that disappears here has a longer range in the Rapla section (Uutela & Tynni 1991).

The lower part of the **Rakvere Stage** (Kiideva and Piilse members of the Rägavere Formation, 126.40–138.20 m; four samples) is represented by 55 species (Appendix 7). The appearing species *Baltisphaeridium ramiferum* has a longer range in the Männamaa (F-367) core than in the Rapla core (Fig. 8; Uutela & Tynni 1991). Six species disappear: *Baltisphaeridium pauciverrucosum*, *B. verrucatum*, *Micrhystridium brevispinosum*, *Orthosphaeridium densiverrucosum*, *Dictyotidium reticulatum* and *Labyrinthosphaeridium curvatum* (Appendix 7, 8). In the upper part of the Rakvere Stage (Tudu Member of the Rägavere Formation, 117.40–126.40 m; four samples) two new species were found in the assemblage of 32 species (Appendix 7), while two species disappeared: *Gorgonisphaeridium antiquum* and *Tylotopalla* sp. (Appendix 8).

The lower part of the **Nabala Stage** (Paekna Formation, 108.00–117.40 m, four samples) is represented by 32 acritarch species (Appendix 7). Two species appear here, whereas *Ordovicidium aequifurcatum* occurs only in the Paekna Formation of the Nabala Stage, but *Goniosphaeridium polygonale* f. *rugosum* ranges up to the Adila Formation of the Pirgu Stage (Appendix 8). *Baltisphaeridium nanninum* and *B. perclarum* disappear in the lower part of the Nabala Stage. The upper part of the Nabala Stage (Saunja Formation, 104.00–108.00 m; two samples) is the second poorest interval next to the Porkuni Stage in the Upper Ordovician part of the Männamaa (F-367) core. A total of 16 acritarch species were found, and no new species appear in this interval (Appendix 7), *Baltisphaeridium digitiforme*, however, disappears (Appendix 8). In the Rapla core *B. digitiforme* reaches only the Rakvere Stage (Uutela & Tynni 1991).

In the **Vormsi Stage** (Kõrgessaare Formation, 87.00–104.00 m; nine samples) 68 acritarch species were found; 17 species disappear (Appendix 7). Three new species *Leiofusa brevispinosa*, *Baltisphaeridium heitzelinii*, *Multiplicisphaeridium verrucosum* appear here, whereas the last two occur only in this stage. *Baltisphaeridium? bramkaense*, *B. oligopsakium*, *B. pustulatum* and *Rhopaliophora pilata* disappear (Appendix 8).

In the lower part of the **Pirgu Stage** (Moe Formation, 68.20–87.00 m; 13 samples) 84 acritarch species were identified. Eight new species appear in the Moe Formation (Appendix 7), e.g. *Goniospaheridium oligospinosum* (Appendix 8), which appears in the Rapla core slightly later, at the end of the Adila Formation (Uutela & Tynni 1991), while in Lithuanian sections it is present also in the Rakvere Stage (Paškevičienė 2001). *Cheleutochroa elegans*, *Lophosphaeridium regulare*, *Micrhystridium curvatum* and *Multiplicisphaeridium cornigerum* are found only in the Moe Formation. Fourteen species disappear in the Männamaa (F–367) core (Appendix 7). The upper part of the Pirgu Stage (Adila Formation, 52.20–68.20 m; 11 samples) is represented by 74 species (Appendix 7). Three new species appear in the Adila Formation. All of them are large in size, e.g. *Estiastra* sp., which appears in the Moe Formation in the Rapla core (Fig. 8; Uutela & Tynni 1991). Large *Goniosphaeridium* sp. 1 was previously unknown (Appendix 8). Fifty species disappear in the Adila Formation of the Männamaa (F–367) core (Appendix 7).

Four successive members (from below): Röa, Vohilaid, Siuge and Tõrevere (Appendix 8) are distinguished in the **Porkuni Stage** (Ärina Formation, 46.50–52.20 m; five samples). Three samples were barren (Appendix 7). The Röa Member (50.40–52.20 m; one sample) is very poor, containing four long-ranging species. The Vohilaid Member (49.30–50.40 m) was not sampled. The Siuge Member (49.10–49.30 m; two samples) yielded an assemblage of nine species. In the lower sample *Estiastra* sp. and *Goniosphaeridium oligospinosum* are common (Fig. 8; Appendix 8), the upper sample is barren. The two acritarch samples from the Tõrevere Member (46.50–49.10 m) were barren.

The **Llandovery** Series of the **Silurian** is represented by limestones of the **Juuru Stage** in the Männamaa (F–367) core (Appendix 8). Two formations are distinguished: Varbola and Tamsalu. The lowermost part of the Varbola Formation (Koigi Member, 46.00–46.50 m; one sample) is very poor in acritarchs; only three long-ranging species are found (Appendix 7). The upper part of the Varbola Formation contains 25 species, with *Pulvinosphaeridium* sp. and *Veryhachium oligospinoides* being common (Fig. 8; Appendix 8). The sample from 36.80 m in the lower part of the Tamsalu Formation (Tammiku Member, 34.00–37.00 m; four samples) was rich in acritarchs and yielded an assemblage of 12 species, including long-ranging and large species like *Estiastra* sp., *Goniosphaeridium oligospinosum*, *Multiplicisphaeridium digitatum* and *Veryhachium oligospinoides* (Fig. 8; Appendix 8). *Pulvinosphaeridium* sp. is common. The upper part of the Tamsalu Formation (Hilliste Member, 29.00–34.00 m; two samples) is characterized by an assemblage very similar to that of the Tammiku Member, however *Multiplicisphaeridium digitatum* and *Veryhachium oligospinoides* are both missing (Appendix 8). In Gotland *M. digitatum* (syn. *Hoeglintia digita*) reaches up to the Wenlockian Mulde/Halla Formation (Le Herissé 1989).