



FIG. 3.—Distribution of genes in deep-Mediterranean Thaumarchaeota and GII/III-Euryarchaeota pangenomes as a function of their class of origin. The proportion of distant donors for early- and late-horizontally acquired genes is indicated.

expressed genes. At any rate, the lack of reference genomes for Euryarchaeota, especially for GIII, prevents to attribute confidently fosmids without 16S rRNA genes to any of the two groups. Consequently, for the purpose of this work, and because GII and GIII are clearly monophyletic, we considered a collective GII + GIII-Euryarchaeota pangenome for the rest of our phylogenetic study.

Phylogenetic analyses of single-copy conserved marker genes, such as 16S rRNA genes, EF-2, or ribosomal protein S2 (fig. 1 and supplementary fig. S2, Supplementary Material online), revealed a diversity of deep-sea Mediterranean Thaumarchaeota and GII/III-Euryarchaeota congruent with previous studies from the same samples (Martin-Cuadrado et al. 2008). Thaumarchaeal fosmids were vastly dominated by a few closely related operational taxonomic units (OTUs) forming a sister, though distant, clade to the *Cenarchaeum-Nitrosopumilus* cluster (Martin-Cuadrado et al. 2008) (fig. 1).

This clade is widely represented in the deep ocean and therefore represents a clade of truly deep planktonic Thaumarchaeota, in contrast to the *Cenarchaeum-Nitrosopumilus* clade, which might correspond to organisms best thriving in other marine niches (e.g., sponges, sediment, and surface waters). In addition, a minor proportion of fosmids corresponded to a basal, typically marine lineage branching out earlier than the soil Thaumarchaeota cluster, sometimes referred to as the ALOHA or 1A group (DeLong et al. 2006; Martin-Cuadrado et al. 2008; Pester et al. 2011) (fig. 1 and supplementary fig. S2, Supplementary Material online). Euryarchaeal fosmids encompassed a series of OTUs distantly related to the surface GII-euryarchaeote composite genome and to a clade of more basal sequences defining the deep-sea GIII-Euryarchaeota (fig. 1 and supplementary fig. S2, Supplementary Material online). Although both marine Thaumarchaeota and GII/III-Euryarchaeota represent relatively