

Fig. 10 –figure supplement 2. Different scenarios for the origins of haptophyte plastids. This schematic tree diagram shows different possibilities for the origins of the haptophyte plastid as predicted from the data within this study. No inference is made here regarding the ultimate origin of the ochrophyte plastid, although it is noted that the ochrophyte, cryptomonad and haptophyte plastids are likely to be closely related to one another within the red plastid lineages. First, a common ancestor of the pelagophytes and dictyochophytes was taken up by a common ancestor of the haptophytes (point 1), yielding a permanent plastid that contributed genes for a large number of plastid-targeted proteins in extant haptophytes. This plastid was subsequently replaced via serial endosymbiosis (point 2) yielding the current haptophyte plastid and plastid genome. This serial endosymbiosis event either involved a close relative of extant cryptomonads (2A) or a currently unidentified species that forms a sister-group in plastid gene trees to all extant ochrophytes, but is evolutionarily distinct from the pelagophytes (2B). It is possible that the haptophyte plastid may have been acquired through the secondary endosymbiosis of a different lineage of red algae to the ochrophyte, either via a cryptomonad intermediate (2C) or directly (2D).

