The Congo river is the second largest in the World in terms of freshwater discharge (1457 km$^3$ y$^{-1}$) and in terms of drainage basin (375106 km$^2$). In this study we sampled the Congo river mainstem and major tributaries along the 1700 km stretch from Kisangani to Kinshasa, during the high water and low water periods. Phytoplankton was analysed using a combination of microscopy with HPLC analysis of marker pigments. During high water, phytoplankton biomass in the mainstream was low (mean Chl a = 0.8 mg m$^{-3}$). Most tributaries presented lower Chl a, with some exceptions, as the Oubangui river (3.6 mg m$^{-3}$). At low water, phytoplankton development in the R. Congo mainstem was higher (Chla 1.1-7.7 mg m$^{-3}$). Phytoplankton was essentially composed of green algae (mostly coccal green algae and some desmids), diatoms (mostly Aulacoseira spp.) and filamentous cyanoprokaryotes. In some samples euglenophytes (mostly Strombomonas spp.) and chrysophytes appeared with greater abundance and diversity. In the low water period, phytoplankton was, as typical in most large rivers, dominated by diatoms, whereas the high water phytoplankton was dominated by coccal green algae, both in the main river and tributaries.