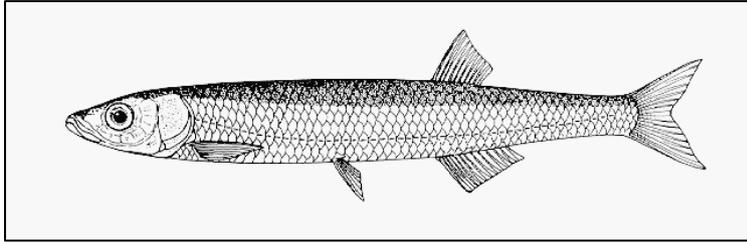


Engraulicypris sardella (Günther, 1868)



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Synonyms

Barilius sardella Günther, 1868

Engraulicypris pinguis Günther, 1894

FAO names

Lake Malawi sardine

Local names

English: Lake Malawi sardine (official FAO name), Lake sardine (Malawi)

Language not specified: Ussipa (Mozambique)

Nyanja (Chichewa): Usipa (Malawi)

Swahili: Usipa (Tanzania)

Geographical distribution

Lake Malawi and the upper Shire River (Lévêque & Daget 1984; Eccles 1992).

Habitat and Biology

Occurs over sandy bottoms in the morning and moves a little offshore later during the day (Konings 1990). Forms schools (Lewis & Tweddle 1990). IUCN red list status least concern (Kazembe et al 2019).

Key features

Body elongate, its height 6.5 times in SL; head length 4 times in SL, head twice as long as deep; maxillary not extending to vertical from front margin of orbit; lower jaw projecting beyond the upper; barbels absent; snout conical, pointed, much longer than eye; eye diameter about 2/9 of head length; suborbital ring much broader than soft naked portion of cheek; origin of dorsal fin nearer to root of caudal than to gill-opening (Günther 1868). Dorsal-fin origin above anal-fin origin or slightly before (Günther 1868; Eccles 1992). Pectoral fin about half of head length (Günther 1868). Steely blue coloration on upper part and silvery blue on lower part of the body (Eccles 1992).

Interest to fisheries

The total catch of Lake Malawi in the period 2006-2016 ranged between 60000 and 90000 tonnes per year, with a rapidly increasing contribution of usipa (*Engraulicypris sardella*) of about 60 to 70% of the total catch (Kolding et al 2019). By 2020, fish catches were estimated at around 170844 tons with *E. sardella* estimated to account for over 70% of the total catch (Mulumpwa et al 2020; Chavula et al 2023).

Engraulicypris sardella is unevenly distributed over the lake: trawl catches during a 1992-1994 survey were approximately ten times higher in the shallow South East Arm (SEA) of the lake than in the central region, with a slight increase at the northern end of the lake (Thompson et al 1996). In

common with most small pelagic species, considerable fluctuations in biomass and fishery landings occur; these can be up to a tenfold increase or decrease within and between years (Turner 1982; Tweddle & Lewis 1990; Lewis & Tweddle 1990). The usipa fishery fluctuates widely in response to environmental variables which may have major impacts on the fisheries for haplochromine cichlids (Weyl et al 2010).

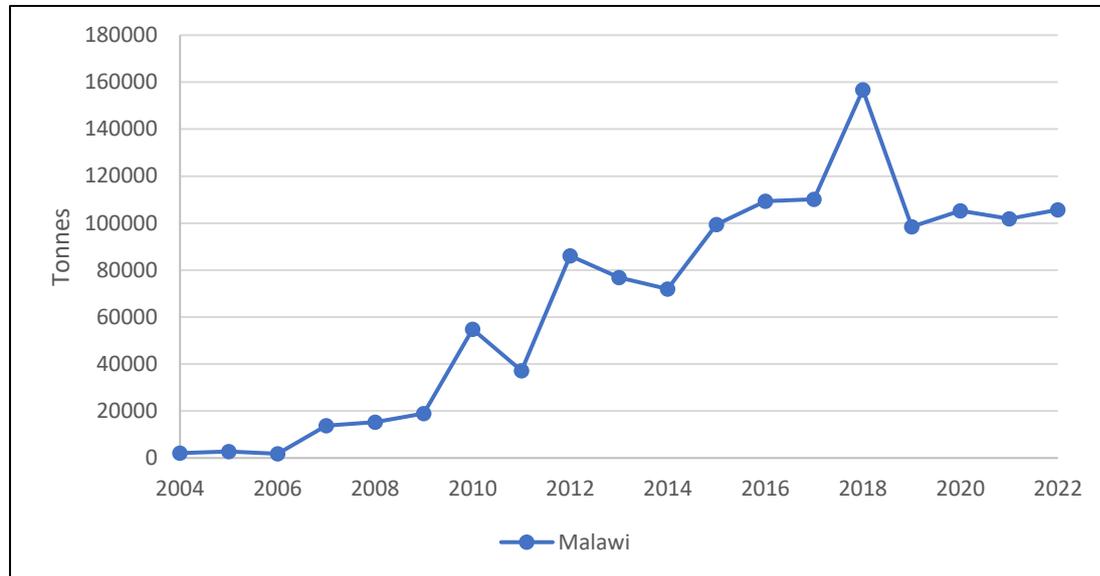


Figure 1: Catches (in tonnes) of *Engraulicypris sardella* as available from FAO (April 2024).

FAO (2024) only holds catch statistics from Malawi for this species (Figure 1). Catches in the Malawian part of Lake Malawi, mainly taken from the SEA and South West Arm (SWA) of the lake, were always dominated by species from the highly diverse haplochromine community, from both the demersal and more pelagic areas of the lake. A light fishery for the small pelagic species *E. sardella* developed as early as the 1970s (Figure 3, Figure 4) (Kolding et al 2019). According to Kolding et al (2019), the developments in the artisanal catches of usipa were most likely severely underestimated in the period between 1974 and 2001, but specifically in the years before 1985. Barnes et al (2002) also mentioned that data from the artisanal fishery is inadequate and catch statistics on usipa must be interpreted with caution. Validation of catch statistics by Lewis & Tweddle (1990), sampling the quantity of marketed dried product, returned estimates of the lake-wide Malawian usipa catch during 11 months in 1985-1986 of 50000-100000 tonnes, contrasting with the official estimate of 5500 tonnes for the same period. The under-estimate by the fisheries' statistical recording system was explained by the fact that *E. sardella* is mainly caught and landed at night, while beach recorders only worked at day (Barnes et al 2002).

In the southern part of Lake Malawi from 1985 to 2011, catches feature a gradual species replacement, with larger species or groups (tilapiines, catfish, others) being replaced by smaller species (haplochromines and usipa), especially in the artisanal fishery (Figure 4). In southern Lake Malawi, by 2001, small species amounted to 80% and usipa to around 30% of the total catch (van Zwieten et al 2011). Data after 2001 are less reliable but estimates indicate that around 2011, usipa catches constituted about 60% of the total catch, and small fish up to 90% (Hara & Njaya 2016). Usipa currently makes up over 70% of the total catches in Malawi (Mulumpwa et al 2020). In the SEA, the total effort of chilimira nets, one of the two main gears that target usipa, steadily increased from 200 nets in 1980 to around 600 nets in 2005. During the 2015 frame survey, 675 chilimira gears were counted in the SEA, while over the whole Malawian part of the lake a total of 3124 chilimira nets were counted, indicating that the total catches are likely 4 to 5 times higher than reported (Kolding et al 2019). With a long-term average annual catch per net, per year in the

chilimira fishery amounting to 16 tonnes, the total Malawian catch of usipa was estimated to be around 50000 tonnes per year, which it appears to have reached in 2015 (Kolding et al 2019).

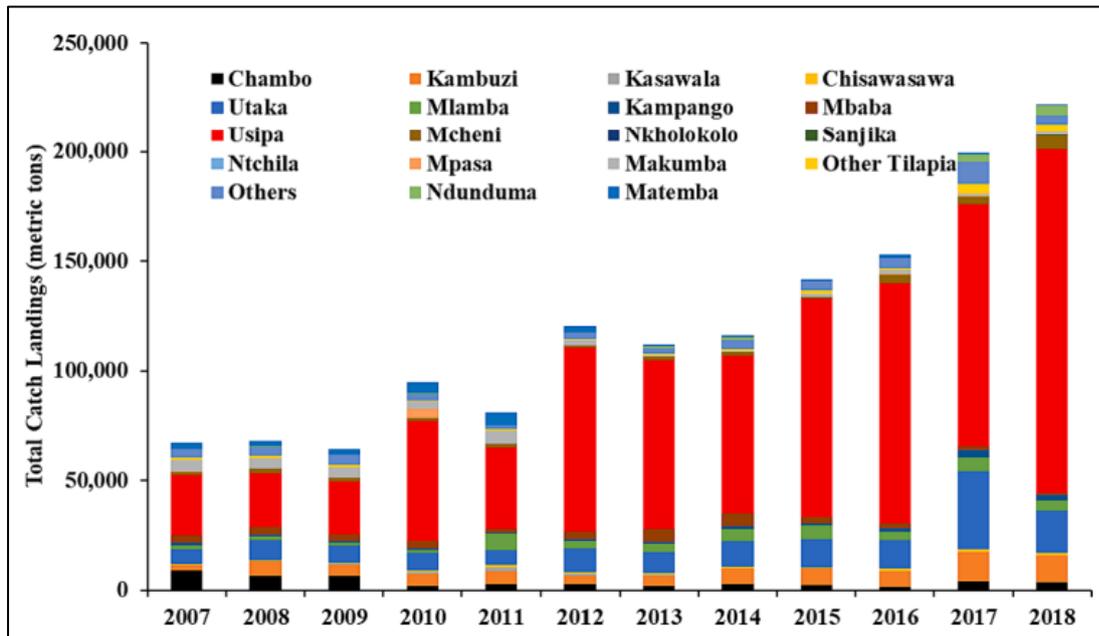


Figure 2: Fish production from the major water bodies of Malawi. Chambo = *Oreochromis spp*, Utaka = *Copadichromis spp*, Usipa = *Engraulicypris sardella*, Ntchila = *Labeobarbus spp*, Kambuzi = *Haplochromine spp*, Mlamba = *Clarias spp*, Mcheni = *Rhamphochromis spp*, Mpasa = *Opsaridium microlepis*, Ndunduma = *Diplotaxodon spp*, Kasawala = *small Oreochromis spp*, Kampango = *Bagrus spp*, Nkholokolo = *Synodontis njassae*, Makumba = *Oreochromis shiranus*, Matemba = *Enteromius spp*, Chisawasawa = *Lethrinops spp*, Mbaba = *shallow water large cichlids*, Sanjika = *Opsaridium microcephalum*. (image from Chavula et al 2023).

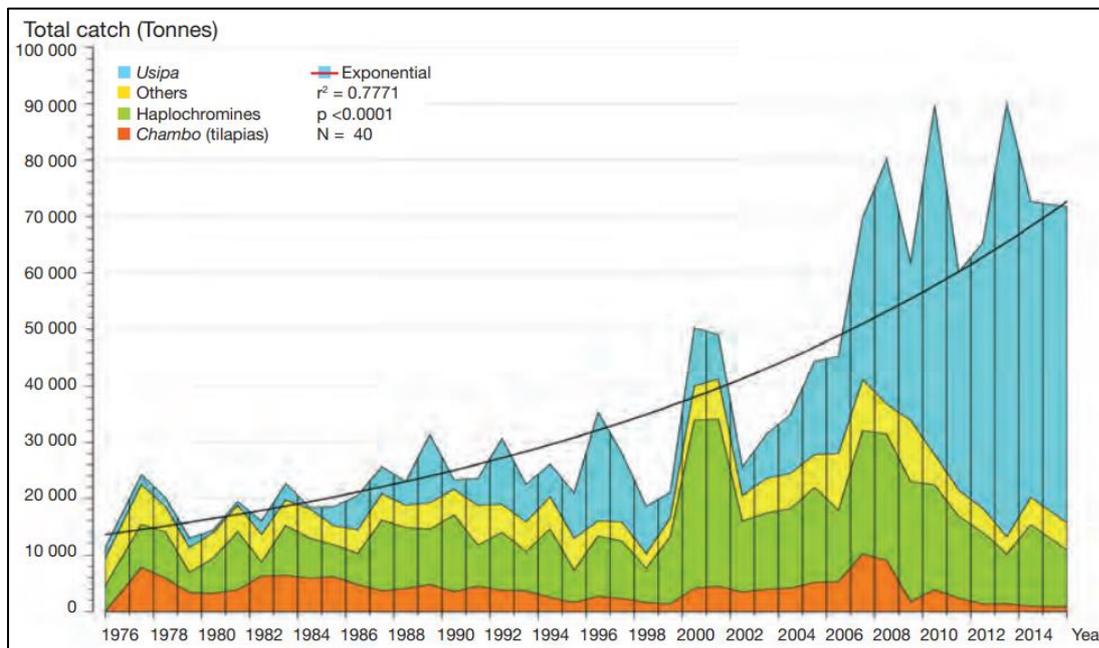


Figure 3: Total catch (tonnes) split into four major groups (usipa, haplochromines, chambo [tilapias], and "others") in the Malawian part of Lake Malawi, 1976 to 2015. There has been a significant exponential increase in the catches of usipa (image from Kolding et al 2019).

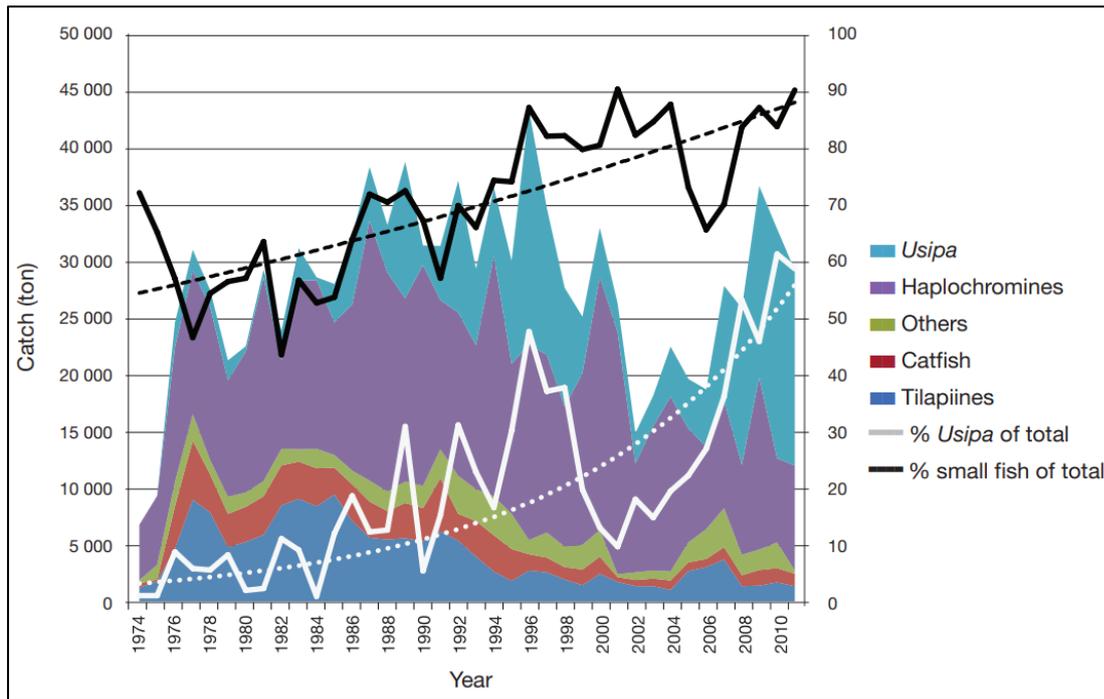


Figure 4: Catch (in 1000 tonnes) of the South East and South West Arm of Lake Malawi by species category between 1974 and 2001; and proportion of the usipa (*Engraulicypris sardella*) and small fish (haplochromines + usipa) in the total catch (image from Kolding et al 2019).

Much less information is available for the Tanzanian and the Mozambican parts of Lake Malawi (Darwall & Allison 2002; Kolding et al 2019). These parts of the lake have steep shores and their fisheries largely target pelagic haplochromines and usipa. The Instituto Nacional de Investigação de Pesqueira conducted surveys in two Mozambican districts between 2000 and 2015: of the total recorded catch of around 4100 tonnes, 64.4% was usipa.

Between 2013 and 2017, in the Kyela district of Tanzania, landings of usipa were estimated to range between 2284 and 5611 tonnes, accounting for up to one third of the total catch (Kolding et al 2019). Eccles (1992) reports that the species is caught using plunge nets, chirimilas or beach seines (lamparas) with light.

Studies on the sustainability of the fishery are contradictory. Bukali et al (1995) reported overfishing of usipa in the Metangula-Mecuio-Messumba area. Although possible, it seems unlikely that an r-selected species with a lake-wide distribution like *E. sardella* would suffer overfishing from a local, artisanal fishery. The explanation seems more likely to be in the great natural variations in biomass (Barnes et al 2002). The fishing mortality and exploitation rate results obtained by Maguza-Tembo (2004) showed that chilimira (light attraction) fishery is being operated above Maximum Sustainable Yield (MSY) in the SWA, whereas it is fairly exploited in SEA. Overall, Maguza-Tembo (2004) concluded that *E. sardella* was fished at MSY (in 2000) and exploitation rates seemed sustainable. Gumulira et al (2019), in a bioeconomic analysis of *E. sardella* in the SEA, concluded that the usipa fishery is overexploited and recommended to reduce the fishing effort by 54% to realize the best economic benefits (production at maximum economic yield) and end overfishing to protect the fishery from biological and economic collapses. Mulumpwa et al (2020) however, modelling and forecasting usipa yields from Mangochi Artisanal Fisheries (also in the SEA), concluded that the fishery is being exploited sustainably, counting on the Usipa Management Strategy for the South East and South West Arms of Lake Malawi and Lake Malombe developed by the USAID/FISH Project to ensure continued effective and sustainable management of exploitation of the fishery.

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