The commercial sea cucumber fishery in Turkey

Mehmet Aydin[1]

Introduction

Commercial sea cucumber species in the Aegean Sea, Mediterranean Sea and the Sea of Marmara in Turkey are not consumed domestically but are exported to Asian countries. It is thought that 37 species in the family Holothuriidae are found in the Mediterranean (Fischer et al. 1987). Prior to 2002, there was no regulation regarding the harvesting of commercial sea cucumbers. In 2002, a regulation was established prohibiting sea cucumber fishing during the reproduction period in order to protect sea cucumber stocks (Anonymous 2002). However, there is very little information concerning existing sea cucumber stocks and fishery activities in Turkey. This study examines the potential sea cucumber fishery in Turkey.

Commercial sea cucumber species in Turkey

In the present study, only the commercial sea cucumber species, *Holothuria tubulosa*, *H. sanctori*, *H. polii*, *H. mammata* and *Stichopus regalis* (Figs. 1, 2 and 3), which commonly occur in Turkey's coastal waters, were considered. Data concerning total production and processing methods were collected from the Turkish Statistical Institute (Ankara, Turkey), General Directorate of Protection and Control (Ankara, Turkey) and private companies (Izmir, Turkey).

Production and processing

Recent total sea cucumber production in Turkey is presented in Table 1. Of the five species considered in this study, *H. tubulosa, H. polii and H. mammata* are the most commonly exported. These species reproduce especially in nearshore areas during summer in the Mediterranean (July, August and September) (Despalatovic et al. 2004). They live in coastal areas on rocky or soft substrates, between 0 m and 100 m depth. *Posidonia oceanica* meadows are suitable habitats for this species (Fischer et al. 1987).

Stichopus regalis was exported only in 1996 and 1997. This species occurs in the Sea of Marmara and is commonly found in areas deeper than 40 m (Kınacıgil et al. 2003).

Note: 2006–2007 data from DIE. 1996–2005 data from private companies and the General Directorate of Protection and Control.)

Production of sea cucumber fluctuated between 1996 and 2007, and even stopped from 1998–2001. The main reason may have been limited demand during the low production period.

The government allows fishermen to collect sea cucumbers by diving year round, except from 1 August to 15 September. During fishing, a surface-supplied air system is used for divers. One diver can collect approximately 2,000–3,000 sea cucumbers in a day (Fig. 4). *S. regalis* was obtained as bycatch in shrimp beam trawls in the Sea of Marmara.

Collected sea cucumbers are purchased by the piece by processing companies, and are transferred to processing facilities in plastic barrels. Sea cucumbers are first eviscerated and washed with cold water, regardless of processing methods. During process-

Table 1. Total production and processing methods of sea cucumber in Turkey.

Year	Total production (kg)	Processing	Basis of production amount
1996	19,868	Frozen	Fresh
1997	37,665	Frozen	Fresh
2002	172	Flour	Dry
2003	10,843	Dried and flour	Dry
2004	5,421	Dried	Dry
2005	53,293	Dried and frozen	Dry + fresh
2006	24,200	Frozen and dried	Dry + fresh
2007	77,238	Frozen, dried and salted	Dry + fresh

1. PhD, Mediterranean Fisheries Research, Production and Education Institute, Antalya,Turkey. Email: maydin69@hotmail.com

ing, different techniques are applied (see Table 1). The processing method depends on recipient companies' requests, but sea cucumbers are generally exported in dried and frozen forms (Fig. 5).

The drying process is carried out in two ways: sun drying and oven drying. Sun drying is the preferred technique because of its low cost. However, oven drying (50–60°C for 30 min.) is also done, especially during winter.

There are 22–90 sea cucumbers per kilogram of frozen product and 45–270 pieces per kilogram of dried product. Sea cucumber prices range from USD 7–32/kg. Singapore, Korea, Taiwan, Hong Kong and Norway are the main importing countries.

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Figure 1. *Holothuria tubulosa* and *H. mammata.*

Figure 2. *Holothuria sanctori.*

Figure 3. *Holothuria tubulosa, H.mammata* and *H. polii.*

Figure 4. Surface-supplied air system for divers.

Figure 5. Dried *H. tubulosa.*