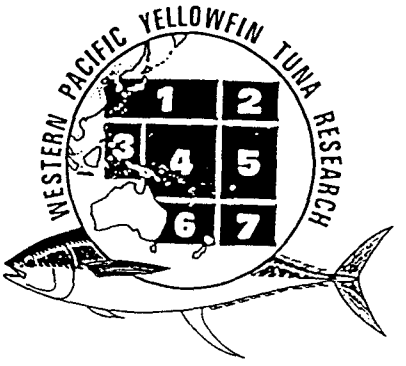

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Changes in Gear Construction of Korean Tuna Longline

by

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Abstract

An increase trend existed in distance between float buoys, lengths of middle part of branch line and wire leader, and a decrease in length of upper part of branch line in recent years. Very recently, the hook rates of bigeye showed somewhat a different pattern as compared with that in the previous years. It is suggested that further study should be carried out to figure out detailed results.

Introduction

Deep-longline fishing method was introduced to Korean tuna longline fishery in the early 1970s. It was known that this method started to catch tunas distributing at deep layer in the Banda Sea and its adjacent regions for the first time (Koido, 1985). Since the first half of the 1980s, most of Korean longliners have used deep longline gear. Some studies on fishing efficiency of this fishing gear indicated that deep gear was more effective than regular one in catching bigeye tuna (Suzuki and Kume, 1981; Koido, 1985; Yang and Gong, 1986; Gong et al. 1989).

In recent years, Korean tuna longliners showed somewhat changes in constructing the longline fishing gear with the view of catching tunas more efficiently. This report is to describe patterns in gear construction of Korean longliners fishing for tunas in the Pacific Ocean.

Materials and Methods

All data dealt with here are based on logbooks, submitted to NFRDI from commercial fishing vessels for tunas in the Pacific Ocean from 1988 to 1996. The logbook sheets contain daily fishing location, amount of catch by species and fishing effort exerted to fish target species and gear specifications. Fig. 1 shows an example of schematic

configuration of Korean tuna longline gear. The vessels' skippers were interviewed to get more information related to this study when they made a visit to NFRDI. About 100 logbook sheets of the whole data sets collected for each year were sampled following to results of the interviews (Table 1). From the database, year after year changes in each component of deep-longline gear and trends in relative abundance of three main target tunas (bigeye, yellowfin and albacore) were described together with a couple of statistical analyses.

Results and Discussion

Fig. 2 shows pattern of changes in gear construction of Korean tuna longline for each component from 1988 to 1996. Distance between buoys has kept a trend indicating a steady increase in average length from 445 m in 1988 to 667 m in 1996 (Fig. 2A). It was clear, from 1992 onward, that the length between float buoys significantly increased. Length of buoy line has gradually increased from 26 m in 1988 to 38 m on the average in 1996 (Fig. 2B).

Lengths of main line and auxiliary main line remained nearly unchanged through the whole years with average values of 64 m~77 m (Fig. 2C) and of 47 m~53 m (Fig. 2D), respectively.

Average length of upper part of branch line had a slightly increasing trend until 1994 and the values both in 1995 and 1996 decreased with a high value of SD (Fig. 2E). Lengths of middle part of branch line (or seizing eauer) and wire leader (or hook wire) had a trend showing a gradual increase (Figs. 2F and 2G). Average length of seizing eauer doubled from 11~13 m between 1988 and 1993 to 21~24 m in 1995 and 1996 with a high value of SD.

Fig. 3 represents a long-term trend of hook rates (fish per 100 hooks) for bigeye, yellowfin and albacore in each branch line (from number 1 to 14). The hook rates of bigeye have shown a high value between the 5th and 11th branch lines from 1988 to 1994. Those both in 1995 and 1996 showed somewhat a different patterns which had a little bit low values compared with the previous years'. As for yellowfin, no changes have shown in its long-term trend which high values were from both branch lines 2~5 and 9~12 and low values from branch lines 6~8. Albacore did not show any apparent trends through time series of data.

It can be summarized preliminary from this study on changes in gear construction of Korean tuna longline that there have existed an increase trends in distance between float buoys, lengths of middle part of branch line and wire leader, and a decrease in length of upper part of branch line in recent years. Very recently, the hook rates of bigeye showed somewhat a different pattern as compared with that in the previous years. It is suggested that further study should be carried out to figure out detailed results with much more information.

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Table 1. Annual sample sizes in number of logbook sheets

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996
Number of logbook sheets	102	100	102	98	100	103	101	98	97

※ One logbook sheet contains daily fishing data reported from a fishing vessel

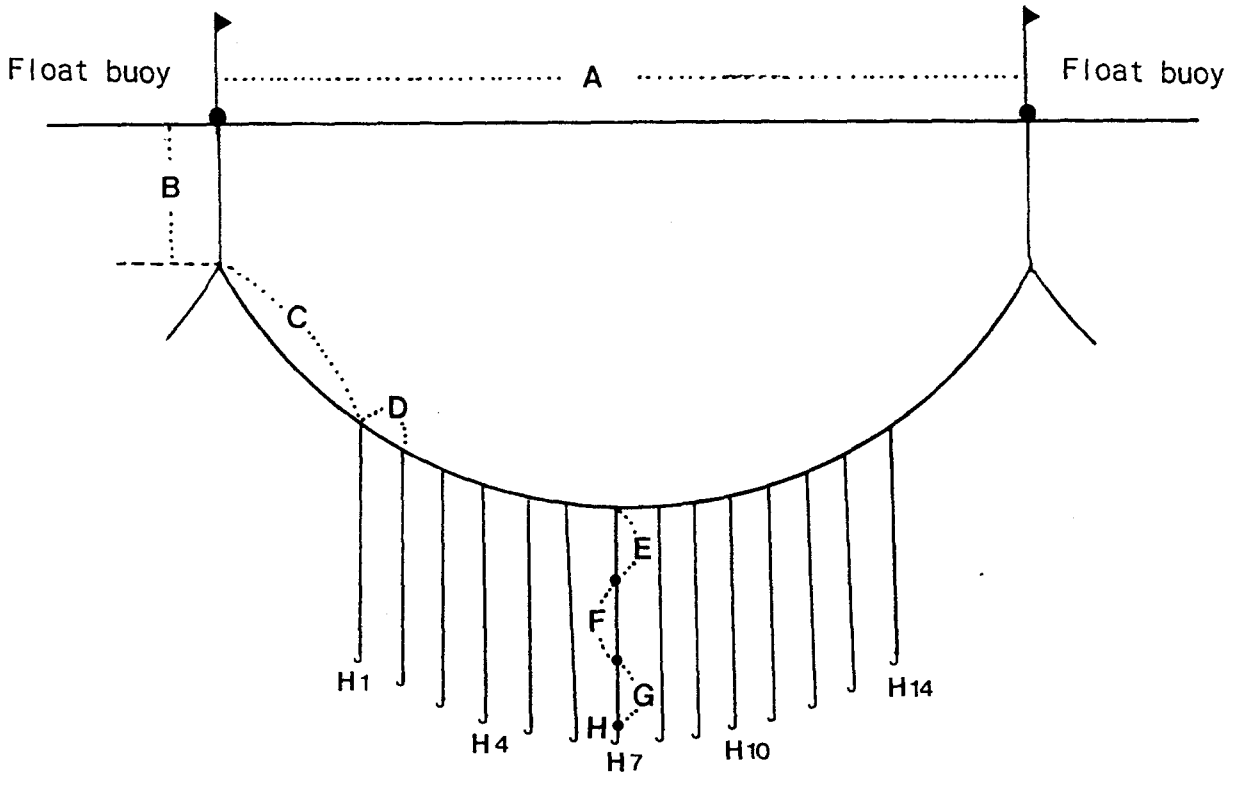

Fig. 1. A schematic view of the Korean tuna longline gears.

A. DBB: Distance Between Buoys (m)
B. BUL: Length of Buoy Line (m)
C. ML : Length of Main Line (m)
D. AML: Length of Auxiliary Main Line (m)
E. UBL: Length of Upper Part of Branch Line (m)
F. MBL: Length of Middle Part of Branch Line (m)
G. WL : Length of Wire Leader (m)
H. HK : Hook (H1~H14 Stand for hook number from 1 to 14)

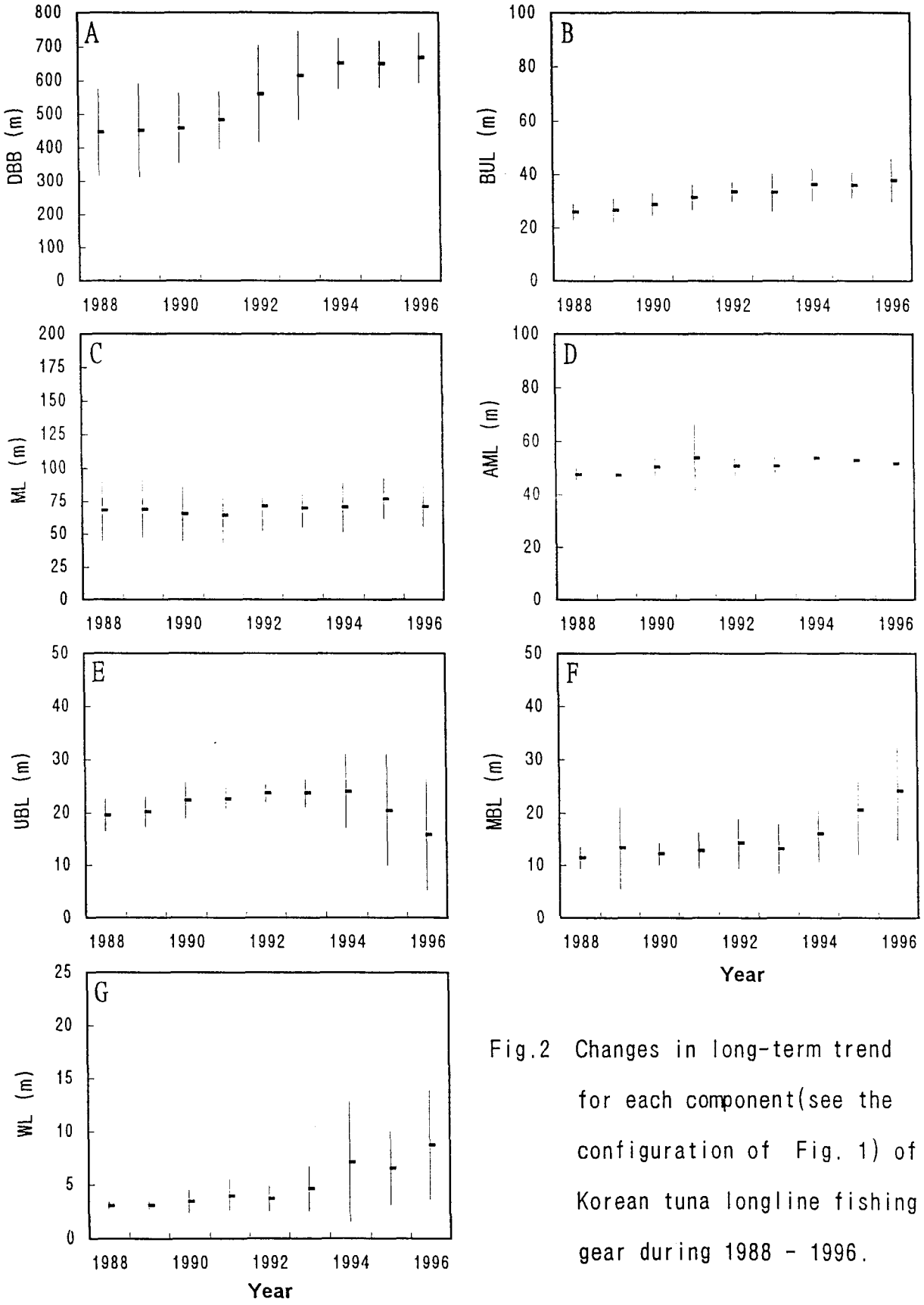

Fig.2 Changes in long-term trend for each component(see the configuration of Fig. 1) of Korean tuna longline fishing gear during 1988 - 1996.

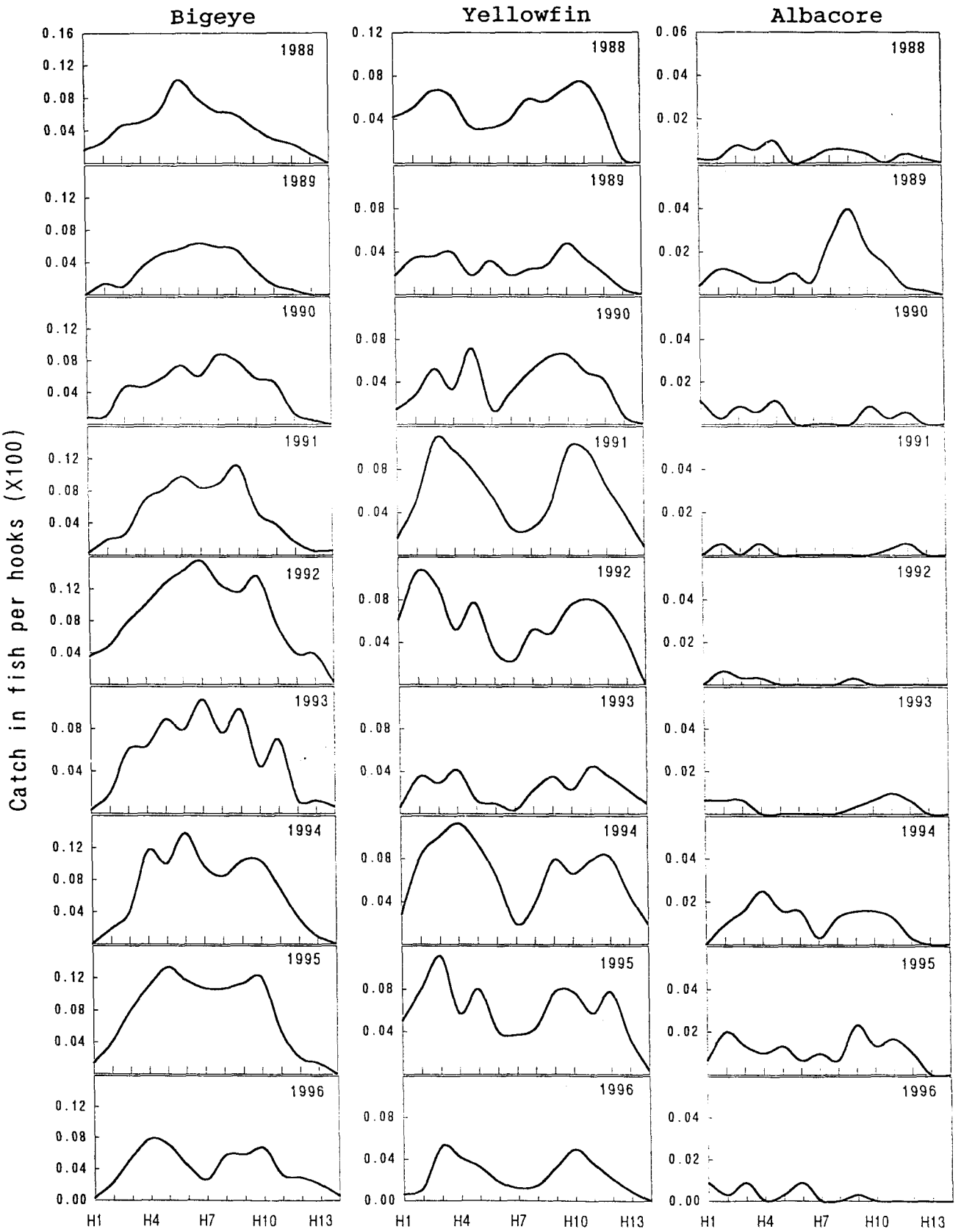

Fig. 3. Trends in hook rates of three major species of Korea tuna longline fishing during 1988~1996.