PROGRESS REPORT ON TAGGING EXPERIMENTS OF CHUB-MACKEREL (*RASTRELLIGER NEGLECTUS*) IN THE GULF OF THAILAND 1961

by

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ABSTRACT

The results obtained from continued tagging experiments of the Chub-Mackerel during 1961 in the Gulf of Thailand are discussed. Most recoveries occured within 30 miles of release points and within 10 days of tagging.

INTRODUCTION

The chub-mackerel is generally referred in Thailand to two species; *Rastrelliger neglectus* (Pla-tu), and *Rastrelliger kanagurta* (Pla-lung). *Rastrelliger neglectus* is the most important one for commercial fisheries in Thailand. In order to plan an effective way for Thai fishermen to properly utilize the fish stocks, the *Rastrelliger* research program was initiated by the Thai Department of Fisheries in 1958. Tagging study is a part of the *Rastrelliger* research program. *Rastrelliger* tagging in Thailand was planned in two stages. A preliminary tagging program was carried out in 1959 by applying plastic dart tags to the fish in order to get acquainted with tagging procedure and to study the mortality rate of tagged fish (Bandhukul, S. and S. Ruamraks, 1960). The second stage of the tagging program was conducted in 1960 to obtain information concerning migration and growth rate of the fish and to demonstrate the system to the fishermen who would play an important role in the full scale tagging program to be undertaken in the near future (Bandhukul, 1961). The *Rastrelliger* tagging program was continued during 1961, when 5,673 tagged *R. neglectus* were released in the Gulf of Thailand. The results of the 1961 experiments are described in this paper (Fig. 1).

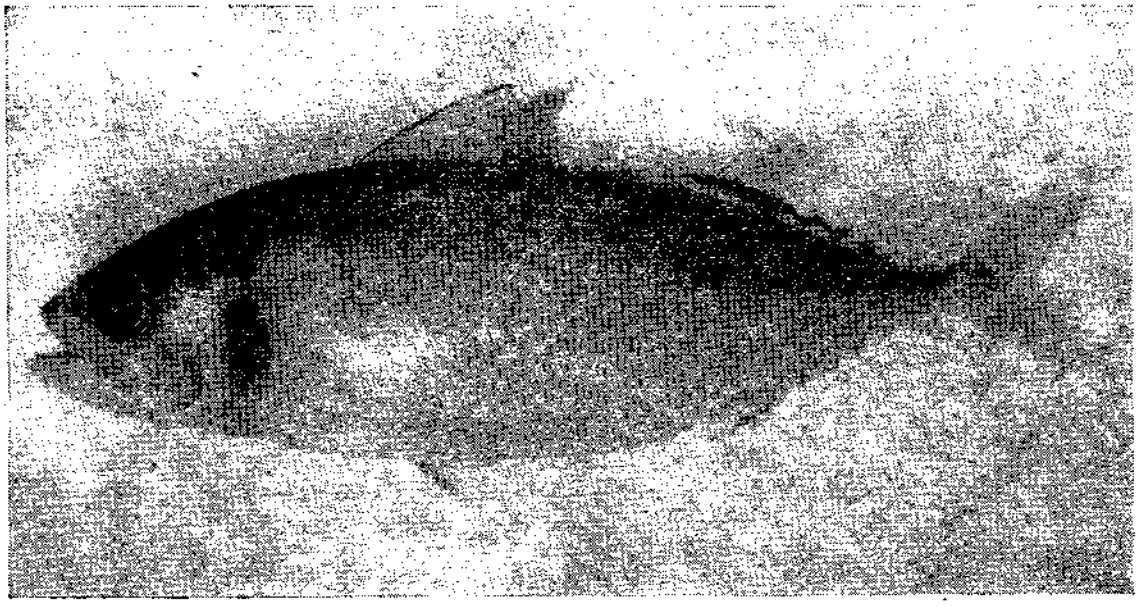

Fig. 1. Recaptured *R. neglectus*

PURPOSE OF THE PROGRAM

Tagging experiments on *R. neglectus* were carried out to obtain information concerning life history, migration, sub-populations, estimate of population size, and fishing mortality.

MATERIALS AND METHODS

1. Equipment Used

The equipment which was used in this experiment included the live boat, the enclosure, flat dart tags, and other equipment which has already been described by Bandhukul (1961). The floating live box is an addition to those described. It was used to keep live fish before tagging. The box was made of wood, the sides and the bottom of which were covered with wire screen of $\frac{1}{2}$ in. mesh size, but the upper side was left opened. The compartment was 4 meters long, 3 meters wide, and 1.8 meters deep. Four empty 200 liter oil drums were attached to the corners of the box to keep it floating (Fig. 2).

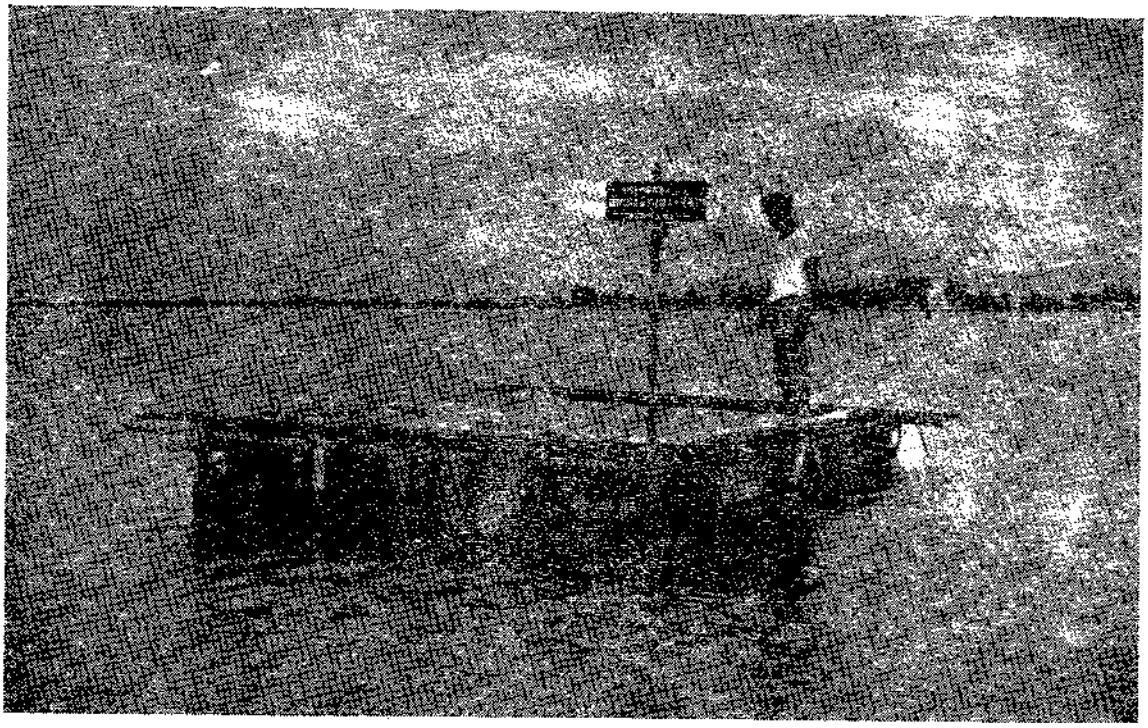

Fig. 2. The Floating Live box

2. Method of Tagging

The transportation of live fish and tagging procedures were the same as those described by Bandhukul (1961).

LIBERATION AND RECOVERY OF THE TAGGED FISH

In this experiment, 5,673 tagged *R. neglectus* were released at two localities in the Gulf of Thailand during January and July 1961. Of these, 664 tagged adult fish were released in the inner Golf, and 5,009 tagged juvenile fish in the Prachuab Province about 12 miles off shore. The details of liberation are shown in Fig. 3. The fishermen who brought tagged fish with information as to date and place of catch to the local fisheries officers were rewarded (Bandhukul, 1961).

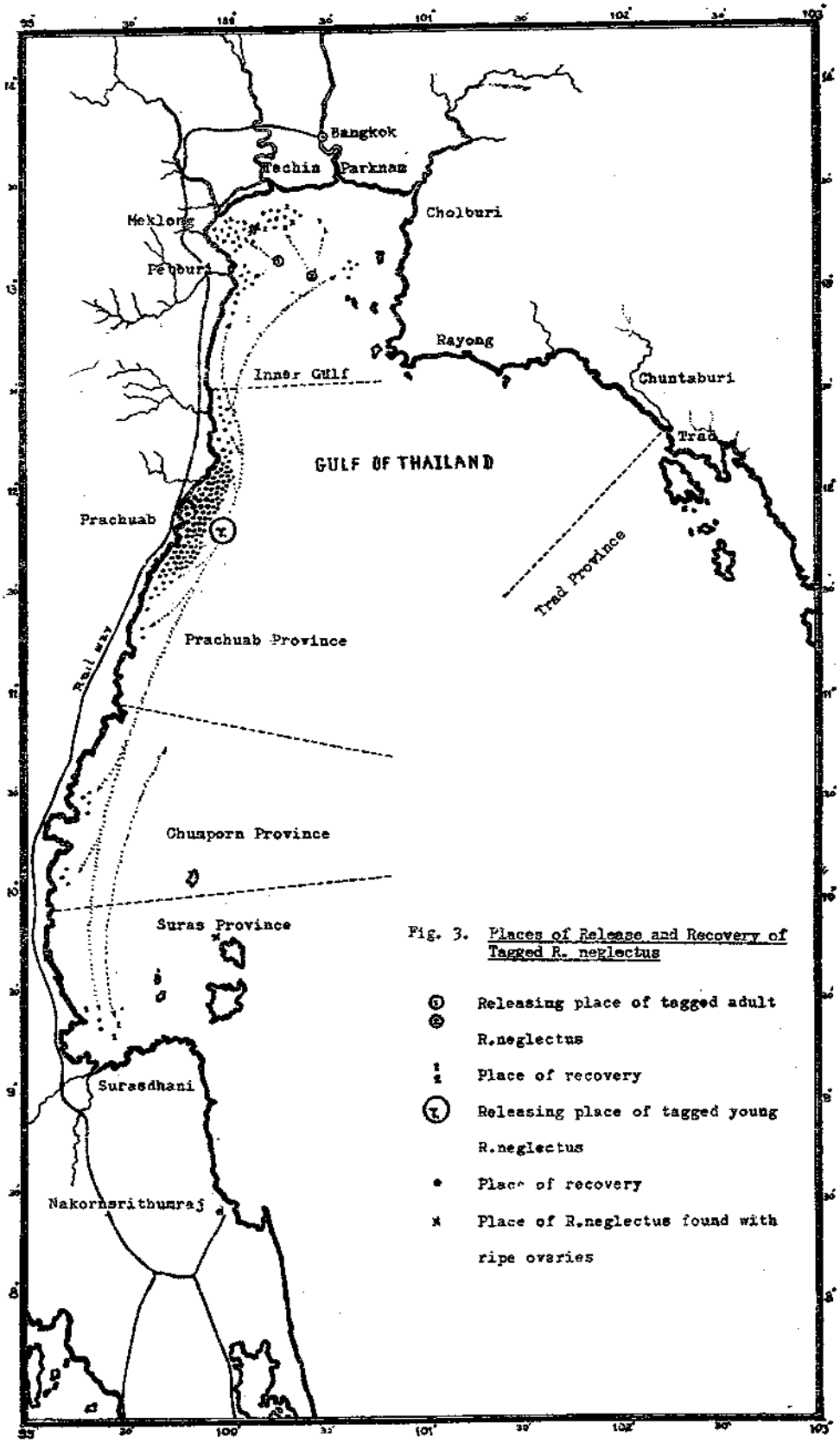

Fig. 3. Places of Release and Recovery of Tagged R. neglectus

- ① ② Releasing place of tagged adult R.neglectus
- Place of recovery
- Releasing place of tagged young R.neglectus
- Place of recovery
- Place of R.neglectus found with ripe ovaries

RESULTS

Through 28 February 1962, 558 tagged *R. neglectus* were recovered. Of these 481 were tagged fish which were released in the Prachuab Province (9.6% of tag released) and 77 were fish released in the inner Gulf (11.6% of tag released). These tagged fish were recovered by various types of gear as shown in Tables I and III.

Most of the tagged fish were recovered in the areas not more than 30 miles from the release points, and the percentages of recovery outside these areas were very low; most of them were recovered in the stake net areas not more than 20 meters deep. The details of places at which the tagged fish were recovered are shown in Tables II, IV and are illustrated in Fig. 3.

The writer presumes that the migration of the chub-mackerel may occur during its spawning seasons. The matured fish probably go out off shore to the spawning areas, and the juvenile fish will move to the coastal areas where they stay for growth and feeding. The density of distribution of chub-mackerel depends on the abundance of food. When they reach maturity, they move back to the spawning areas in the outer Gulf. These presumptions are based by the reasons described as follows:

a) Studies on the maturity of *R. neglectus* indicated that the first spawning season began in February and March (Bandhukul, 1959). If there were spawning migrations they would probably occur during January and February.

b) According to results of tagging experiments on *R. neglectus* in the inner Gulf of Thailand in January 1961, the larger percentage of recovery occured in the inner Gulf during the first and second weeks of February 1961, and the percentage of recovery after this time was very low. The total catch of the fish has decreased, and it was thought that the fish may have moved away from their usual haunts if not for feeding, then possibly for spawning.

c) *R. neglectus* with ripening egg in the body cavity were found in samples taken from commercial catches at Suras Province in February 1960. And some of the tagged *R. neglectus* released in the inner Gulf in January 1961 were recovered at Suras Province in February 1961.

d) The distribution of the juveniles of *R. neglectus* was in the coastal areas of the Prachuab Province during April and May. These fish were captured by stake nets and they were found mingling with anchovy.

Tagged *R. neglectus* were recovered within 1 to 248 days after they had been released, the higher percentages of recovery occuring between 1 and 10 days after released. The percentage of recovery after this time was low. One tagged fish was in the sea for 248 days before it was recovered. After 248 days from the time of liberation no more tagged fish were recovered. Fig. 4 shows the number of tags recovered and days which they were in the sea. The growth rate of the tagged fish is also shown in Table V.

REFERENCES

Bandhukul, S. (1959): Questions and Answers on Rastrelliger. *Thai Fish. Gaz.*, 12(4): 355-371.

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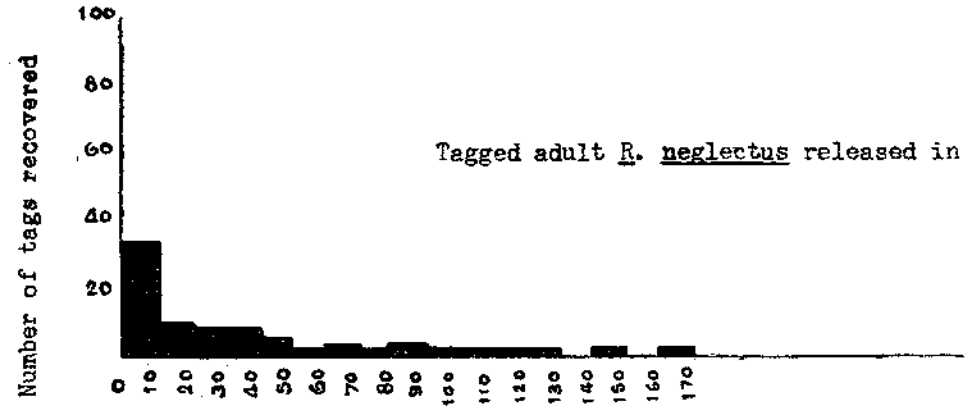
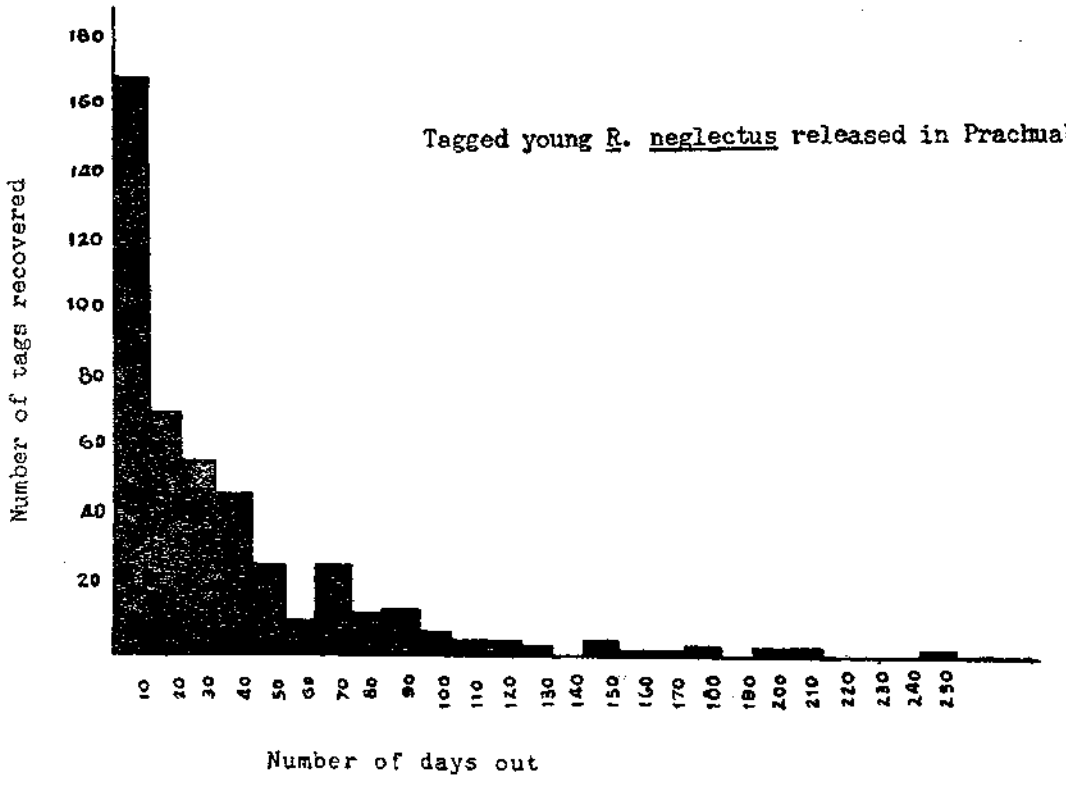
Fig. 4. Number of tags recovered, and time interval between release and recovery



Tagged adult R. neglectus released in the inner Gulf



Tagged young R. neglectus released in Prachuab Province

TABLE I

*Recovery of tagged **R. neglectus** released in the inner Gulf according to types of gears (through 28 February 1962)*

Types of Gear	Number of tags recovered		
Stake nets	60	77.92 %	of tag recovered
Chinese purse seines	4	5.19 %	of tag recovered
Thai purse seines	1	1.30 %	of tag recovered
Encircling gill nets	3	3.90 %	of tag recovered
Others	9	11.69 %	of tag recovered
Total	77	11.60 %	of tag released

TABLE II

*Recovery of tagged **R. negleclus** released in the inner Gulf accoring to places of recovery (through 28 February 1962)*

Places of Recovery	Number of tags recovered		
Parknam Province	2	2.60 %	of tag recovered
Tachin Province	4	5.19 %	of tag recovered
Meklong Province	37	48.05 %	of tag recovered
Petburi Province	26	33.77 %	of tag recovered
Prachuab Province	5	6.49 %	of tag recovered
Suras Province	3	3.90 %	of tag recovered
Total	77	11.60 %	of tag recovered

TABLE III

*Recovery of tagged **R. neglectus** which were released in Prachuab Province according to types of gear, and number of tags recovered (through 28 February 1962)*

Date of Liberation	Number Liberated	Types of gear and number of tags recovered										Total	
		Stake Nets		Chinese Purse Seines		Thai Purse Seines		Encircling Gill Nets		Others			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
28 April 61	777	18	60.00	9	30.00	1	3.33	1	3.33	1	3.33	30	3.86
29 April 61	778	7	35.00	8	40.00	2	10.00			3	15.00	20	2.57
11 May 61	896	83	76.15	15	13.76	3	2.75	6	5.50	2	1.83	109	12.17
1 June 61	619	47	67.14	14	20.00	4	5.71	1	1.43	4	5.71	70	11.31
11 June 61	619	40	58.82	24	35.29			3	4.41	1	1.47	68	10.99
16 June 61	456	17	34.00	22	44.90	7	14.29	2	4.08	2	4.08	50	10.96
17 June 61	288	10	27.78	19	52.78	5	13.89			2	5.56	36	12.50
3 July 61	576	86	87.76	10	10.20	1	1.02			1	1.02	98	17.01
Total	5,009	308	64.17	121	25.26	23	4.80	13	2.71	15	3.13	481	9.60

TABLE IV

Location and number of recoveries of tagged fish which were released in Prachuab Province between April and July 1961 (through 28 February 1962)

Date of Liberation	Number Liberated	Suras		Chumporn		Prachuab		Petburi		Inner Gulf		Cholburi		Unknown		Total	
		No. *	% **	No.	%	No.	%	No.	%	No. ***	%	No.	%	No.	%	No.	% ****
28 April 61	777			1	3.33	14	46.67	4	13.33	7	23.33	1	3.33	3	10.00	30	3.86
29 April 61	778			2	10.00	12	60.00	1	5.00	4	20.00	1	5.00			20	2.57
11 May 61	896	1	0.92			99	90.83			7	6.42	1	0.92	1	0.92	109	12.17
1 June 61	619			3	4.29	63	90.00			4	5.71					70	11.31
11 June 61	619			1	1.47	54	79.41	3	4.41	8	11.76			2	2.94	68	10.99
16 June 61	456			3	6.00	39	78.00	4	8.00	3	6.00	1	2.00			50	10.96
17 June 61	288			1	2.78	30	83.33	1	2.78	3	8.33	1	2.78			36	12.50
3 July 61	576	2	1.02	1	1.02	91	92.86	1	1.02	2	2.04	1	1.02	1	1.02	98	17.01
Total	5,009	2	0.42	12	2.51	402	83.92	14	2.91	38	7.92	6	1.25	7	1.46	481	9.60

Remark : * Number recovered.

** Percentage of recovery according to the number of recovery of each liberation.

*** Paknam, Tachin and Meklong Province.

**** Percentage of recovery according to the total number of tag released.

TABLE V

The growth rate of tagged ***R. neglectus*** *and the number of days which they were in the sea*

Size at Liberation LB(mm.)	Number of days in the sea														
	1-15	16-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151-165	166-195	196-210	211-240	241-255
90-95	+16	+29.3	—	—	—	—	—	—	—	—	—	—	—	—	—
96-100	+3.85	+18	—	+66	+39	—	—	—	—	—	—	—	—	—	—
101-105	+7.2	+ 8.44	+22.66	+2	+44	—	—	—	—	—	—	—	—	—	+49
106-110	+3.08	+11.64	+23	+33	+29	+34.33	—	—	+36	+41	+37	—	—	—	—
111-115	+0.92	+10.12	+18.28	+24	+28.72	+29	—	—	—	—	—	—	—	—	—
116-120	+2.84	+ 8.75	+16.10	+17.2	+16.75	—	—	+29	+28.5	—	—	—	+32	—	—
121-125	+2	+10.10	+13.5	+15.6	+19	+20	+34	—	—	—	—	—	+32	—	—
126-130	+2.19	+12	+16.37	—	+13	+20	—	—	—	—	+35	—	—	—	—
131-135	+1.2	+5	+10	—	+17.5	+10.5	—	—	—	—	+16	—	—	—	+18
136-140	+4.3	+7	+7	+12.5	+8	—	+16	+8	—	+18.5	—	—	+25	—	—
141-145	+4	—	—	—	+7	—	—	—	—	—	—	—	—	—	—
146-150	+0.5	—	-3	—	—	—	—	—	—	—	—	—	—	—	—
151-155	+0.33	—	—	—	—	—	+24	—	—	—	—	—	—	—	—
156-160	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
161-165	+1	—	—	—	—	—	+9	—	—	—	—	—	—	—	—