

The Sunspot Observations Made In 2005

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We present, photospheric sunspot observations of the year 2005 made at the Istanbul University Observatory

This paper gives the heliographic coordinates for the sunspot groups observed in 2005 and some other results.

The photosphere of the Sun is observed on every clear day at the Istanbul University Observatory. A refracting telescope is used for this purpose; the aperture of the objective and focal length are 13cm. and 200cm. respectively. Sunspots and faculae are drawn on a projection disk of a diameter of 25cm. The heliographic coordinates of the sunspot groups are determined by using the Astronomical Almanac for which the Position Angle of the Sun's axis P_0 , Heliographic Latitude B_0 , Longitude L_0 are calculated for the time that observation was made. Each sunspot group is observed for a single rotation of the Sun and the results obtained during this period, are given in Tables and in Figures.

In this paper, columns in Table I give the following (1): Current numbers of the groups; (2) and (3): The mean latitude and longitude of each group respectively; (4) and (5): First and last observations of the groups respectively; (6): Evolution of the groups which are classified according to McIntosh Sunspot Group Classification (Solar-Geophysical Data, 1984). The first upper case letter in column gives "Modified Zurich Class". The second upper case letter gives the penumbra of the largest spot. The third upper case letter in the column gives the sunspot distribution. The Figures after these letters give the number of umbrae in each group. The sign "?" denotes a group which was observed at the edge of the disk and could not be identified in the McIntosh Classification. The sign "X" is used to express that the group probably could not be observed on that day, and "-" that no observation was done on that day because of weather conditions or other reasons.

In 2005, 131 groups were observed; 2 of them have a latitude of 0° , 55 of them have an average latitude of $+10.29^\circ$ in the North Hemisphere and remaining 76 groups have an average latitude -9.53° in the South Hemisphere. The distribution of the groups according to their latitudes is as follows (see Fig.1).

In Table II, number of groups and umbrae are given by decimal numbers for each day; the integer part of these numbers denote the numbers of the groups and the fractional part numbers of umbrae. Letters across these numbers are the abbreviations of the observers' names; the complete names are given at the end of the Table II.

Latitude Intervals	North Hemisphere	South Hemisphere
From 0° to 05°	13	12
From 6° to 10°	9	33
From 11° to 15°	24	22
From 16° to 20°	8	9
From 21° to 25°	1	0
From 26° to 30°	0	0
TOTAL	55	76

Table III and Table IV give the relative Wolf Numbers for the Istanbul University Observatory and the distribution of the groups in types, respectively. Data in Table IV are summarized in Figure 2.

ACKNOWLEDGMENTS

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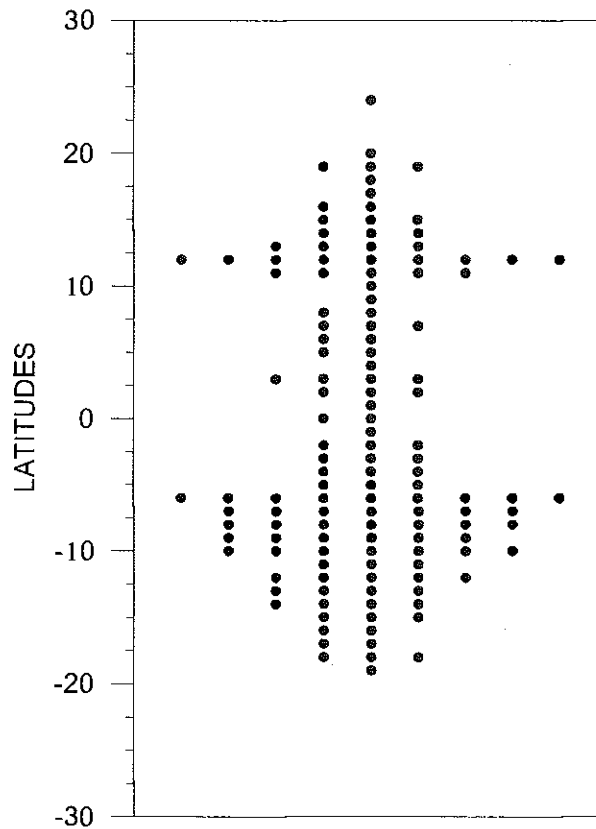


Fig. 1 - Distribution of the groups according to their latitudes.

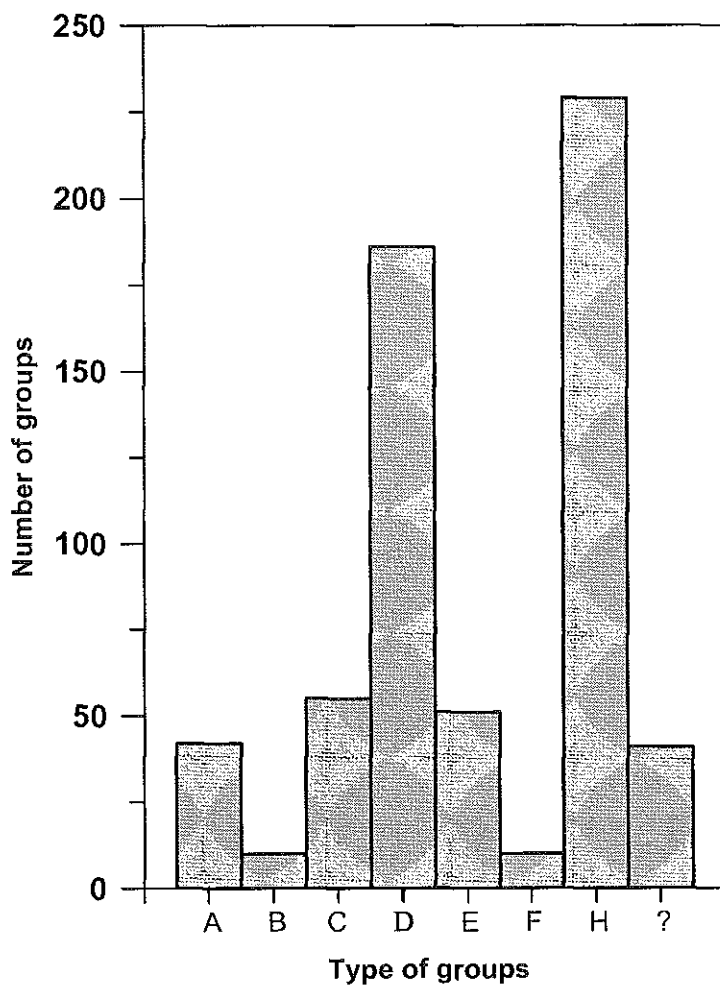


Fig. 2 – Distribution of types of groups

Table I
Evolution of the groups

Current Number	Heliographic Coordinates		Longitude	First Observation	Last Observation	Evolution of the groups									
	Latitude	Longitude				DAI-15	DRJ-9	DRJ-4	HR-3	DAI-5	DRJ-9	DRJ-4	HR-3	DAI-15	DRJ-9
1	5	339.5	01.02.01	01.05.01	DAI-15	DRJ-9	DRJ-4	HR-3							
2	-12	334	01.02.01	01.02.01	BXO-4										
3	1	251	01.03.01	01.03.01	?-1										
4	-16	247	01.05.01	01.05.01	HR-3										
5	-6.5	201	01.07.01	01.19.01	?-2	HS-3	HS-2	HA-4	HA-6	HA-6	HA-6				
6	-7	191	01.08.01	01.12.01	?-1										
7	13.5	179.5	01.10.01	01.20.01	CSO-5	DSO-2	DSO-2	DAO-7	DRJ-15						
8	-5	193	01.11.01	01/1205	DAI-6	DKC-15	DKC-16	FKC-11	FKC-10						
9	5	73.5	01.19.01	01.23.01	HR-1	HS-1		HS-1	HS-1						
10	-5	136	01.20.01	02.18.01	DRJ-12			DAI-5	HS-1						HS-1
11	-2	34.5	01.20.01	01.20.01	HS-1	HS-1		HS-1							HA-2
12	-1	77	01.22.01	01.22.01	DRJ-4										
13	-9.5	19.5	01.23.01	01.31.01	AX-1										
14	-10	308	01.31.01	01.31.01	HS-1			HS-1							
15	18.5	177.5	02.09.01	02.11.01	CAI-7	HR-1	AX-1								
16	13	181	02.09.01	02.11.01	HR-2	AX-1	CRJ-7								
17	11	180.5	02.09.01	02.10.01	AX-3	AX-3									
18	5.5	184.5	02.09.01	02.11.01	CRO-3	HR-4	AX-1								
19	-19.5	199	02.09.01	02.13.01	AX-1	HA-4	HA-4								AX-1
20	-8	153	02.09.01	02.18.01	HA-4	HK-1	HK-3								HK-7
21	-8	125	02.09.01	05.10.01	HK-1	HA-7	HA-7	HS-1							HH-6
					HH-1	HH-4	HH-3								HK-1
						HH-30									HH-2
					HK-2	?-1	HS-1								HH-1
						HH-2	HH-4								DHI-14
															DHO-10

Table 1 (Continued)

22	-8	198	02.10.01	02.10.01	CAO-8	DHO-4 OAO-9 HA-1	?-1 CSI-9 DAO-11	HS-1 CSI-7 ?-1 DAL-12	HS-7 DAO-3 ESC-14 CAI-16	CAI-11 HS-1 EAL-18 CAI-11
23	-4	125	02.13.01	02.13.01	HR-1 AX-2					
24	-13	163	02.16.01	02.16.01	AX-1					
25	13	111	02.18.01	02.21.01	AX-3 ?-1		CAO-7	-	-	DKI-13
26	-9.5	53.5	02.22.01	02.24.01	HA-5	CRO-10	HS-2			
27	-9	13	02.22.01	02.22.01	AX-2					
28	-6	294	02.24.01	02.24.01	CAO-2					
29	12	202.5	03.03.01	04.04.01	?-1 DAL-9	HA-2 - HS-1	DAO-3 DAL-9 HR-1	CAO-4 DAL-5	- -	DAO-8 DAO-2
30	-6	162	03.06.01	04.09.01	HS-1 ?-1 EAL-21 HS-1 HR-1		EAC-11 EAO-12 HA-1	EAL-12 EAO-9 HA-1	- EKO-6 HS-2	EAC-27 HK-3 CRO-3
31	-14	54	03.20.01	03.24.01	DAO-10		CAI-10	HA-6	HR-1	
32	12	344.5	03.21.01	03.25.01	DRI-7	DAO-7 CAI-18	DAO-25	DAO-21	DAO-5	
33	3	60	03.21.01	03.21.01	AX-2					
34	-11	8	03.23.01	03.25.01	DAO-10		DAL-5			
35	2	302	03.24.01	03.24.01	HR-1					
36	-6.5	247.5	04.02.01	04.07.01	DAO-7	DAC-7	DAL-10	DAL-11	DAO-3	?-1
37	11	209	04.07.01	04.07.01	AX-1					
38	-8.5	225	04.08.01	05.29.01	CAO-8	?-6	?-2	DKC-8 DKC-21	DKC-8	DKC-15 DKC-18
39	2	44.5	04.11.01	04.19.01	DKC-7 DAC-21 ?-4	DAO-3 - DAO-3	DAO-3 - DAL-7	EAL-15 - HS-1	- - DSI-7	- - -
40	-4.5	123	04.11.01	04.12.01	CAI-11	HS-2	HS-2			
41	12	102.5	04.12.01	04.13.01	AX-1 AX-3	AX-2 DRO-4				

Table 1 (Continued)

61	3	137.5	06.03.01	06.07.01	BXO-5	HS-4	DAO-8	CAO-3	HR-1	--
62	-5.5	51	06.04.01	07.13.01	?-2	DKO-7	EHI-13	EKC-12	--	HK-1
					EKI-30	DKL-23	DKO-12	--	HK-2	HS-1
					?-2	HS-1	--	--	CSO-2	HS-1
					HS-1	HA-4	HA-3	HS-1	HS-1	HA-1
					HA-1	HA-1	--	--	--	--
63	-3	91	06.06.01	06.06.01	HR-4	HR-4	HR-4	HR-4	HR-4	HR-4
64	4	355	06.10.01	06.10.01	AX-1	AX-1	AX-1	AX-1	AX-1	AX-1
65	7	22	06.14.01	06.15.01	BXO-2	BXO-2	BXO-2	BXO-2	BXO-2	BXO-2
66	-17.5	334.5	06.14.01	06.20.01	DAO-8	DAO-8	DKL-37	EKI-25	--	EKO-10
					EAO-9	EAO-9	--	--	--	--
67	7	292	06.16.01	06.16.01	HS-1	HS-1	HS-1	HS-1	HS-1	HS-1
68	-6.5	253	06.16.01	06.23.01	HA-1	HA-6	--	DAO-10	DRL-21	--
					DRL-6	AX-2	--	--	--	--
69	18	234	06.22.01	06.22.01	AX-2	AX-2	AX-2	AX-2	AX-2	AX-2
70	-13	244	06.22.01	06.22.01	AX-1	AX-1	AX-1	AX-1	AX-1	AX-1
71	14.5	107	06.27.01	07.05.01	HS-1	HS-1	DSL-5	HS-3	HS-2	--
					--	--	DRL-11	HS-3	HS-2	--
72	15	89.5	06.28.01	07.06.01	HR-1	HR-1	CAO-5	DAO-5	--	--
					HR-3	HR-2	HR-1	DAO-7	--	--
73	-3	100	06.28.01	07.08.01	HR-2	HR-2	DAO-10	DKL-20	--	--
					EKC-33	EKI-27	EKC-39	EKI-27	EKI-10	--
74	-10.5	149	06.28.01	07.04.01	AX-1	HR-3	DAO-5	DAO-5	--	--
					AX-1	AX-1	DAO-5	DAO-5	--	--
75	-17	150	06.28.01	07.05.01	AX-2	AX-2	DAI-18	DKI-19	--	--
					CSO-2	HS-1	DAI-21	DKI-19	--	--
76	-18.5	125	06.30.01	07.04.01	DAO-6	DAI-14	--	--	CRO-3	DAO-12
77	16	13	07.04.01	07.14.01	?-3	DAI-5	DAO-7	DSO-10	DAI-16	DAO-12
					EAO-5	EAO-6	ESO-2	ESO-2	HS-1	--
78	20	3.5	07.07.01	07.08.01	HR-2	AX-2	EAC-12	DAO-5	--	--
79	-12	9.5	07.12.01	07.15.01	BXI-8	AX-2	EAC-12	DAO-5	--	--
80	-7	261	07.18.01	07.18.01	AX-2	AX-2	EAC-12	DAO-5	--	--
81	-18	245	07.21.01	07.21.01	HR-2	HR-2	DAI-12	DAI-16	DAI-11	DAI-11
82	13	155	07.22.01	08.01.01	DAO-4	DAO-7	DAI-12	DAI-16	DAI-11	DAI-11

Table 1 (Continued)

83	14	205	07.23.01	07.23.01	08.12.01	HS-2	HS-2	HS-1	?-1		
84	14.5	111.5	08.01.01	08.01.01	08.07.01	DAO-10	DAO-10	HA-3	HA-8		
85	-12	24	07.30.01	07.30.01	08.11.01	HS-1	DAO-8	DAO-10	DSI-15	EKI-26	
						CKI-8	CHO-5	HA-3	HK-2	HH-1	
86	12.5	15.5	07.31.01	07.31.01	08.12.01	HA-1	HA-2	HA-3	HA-5	--	
						HA-2	HA-2	HA-1	HA-1	HA-2	
						HR-1					
87	-2	101	08.01.01	08.01.01	08.01.01	HA-1					
88	-7.5	54.5	08.06.01	08.06.01	08.08.01	HR-2	DAO-4	DAO-2			
89	-14	8	08.07.01	08.07.01	08.07.01	AX-1	X	AX-1			
90	-13	255.5	08.10.01	08.10.01	08.19.01	HS-1	DAO-3	DAI-19	DAI-18	DAO-17	
						EAO-14	HS-2	HS-1			
91	-10.5	226	08.13.01	08.13.01	09.18.01	HR-1	HR-1	HR-1	CRI-4	DAI-17	
						EKI-20	--	DKC-8	DKC-5	?-6	
						EKC-7	EKC-24	EKC-41	FKC-73	EKC-61	
						EKC-37	--	--	HA-2		
92	16.5	156.5	08.18.01	08.18.01	08.28.01	HR-5	CRI-10	EKI-15	HA-2	DAI-29	
						DAO-19	EAO-8	DRI-25	DAI-28		
93	8	138	08.19.01	08.19.01	08.19.01	AX-1	EAO-5	EAO-3	HA-1		
94	-11	123	08.23.01	08.23.01	08.23.01	HR-2					
95	11	111	08.24.01	08.24.01	08.25.01	HA-4	HR-1				
96	8	130	08.26.01	08.26.01	08.28.01	HA-3	HS-1	HA-1			
97	-8.5	24.5	08.27.01	08.27.01	09.06.01	HA-2	HA-2	HA-3	HA-2	HS-9	
						--	HS-3	HA-2	HR-1		
98	-14.5	23	08.28.01	08.28.01	08.31.01	BXO-6	CAI-10	HR-2			
99	-15	348	09.01.01	09.01.01	09.01.01	AX-1					
100	10	240.5	09.07.01	09.07.01	09.12.01	HA-1	HA-1	HR-1	HS-1		
101	11	232	09.12.01	09.12.01	09.12.01	HS-2					
102	12	168	09.17.01	09.17.01	09.17.01	HR-2					
103	9	105.5	09.17.01	09.17.01	10.20.01	?-6	CAO-8	CAO-14	CAI-11	--	
						--	HK-2	HK-1	HH-1	HS-1	
						HA-2	HA-2	AX-5			
							HR-6				

Table 1 (Continued)

104	-2	28.5	09.24.01	09.29.01	DAO-3	HA-2	CAO-3	--	--	HA-2
105	2	69	09.25.01	09.25.01	HA-2	HR-3				HR-2
106	-10.5	24	10.01.01	10.03.01	HA-1	DAI-20	CAI-17	CAO-10	HA-2	
107	-7.5	285.5	10.03.01	10.09.01	CAO-14					
108	-10	244	10.09.01	10.09.01	HR-2					
109	-6	236	10.09.01	10.09.01	AX-1					
110	-8	294	10.31.01	10.31.01	CAO-4					
111	-6	287	10.31.01	11.02.01	DAO-6		HS-1			
112	-16	285	11.08.01	11.08.01	CSO-2					
113	0	147	11.14.01	11.14.01	HA-1					
114	-7	87	11.14.01	12.20.01	FKC-21	FKI-29			FKC-19	--
					FKO-5	FKO-9	FAO-4		--	--
					--	--	--	HA-1	HS-1	CSO-6
115	-13.5	346	11.20.01	11.29.01	DAO-3	DAO-3		HA-2		
116	-7	339	11.25.01	11.25.01	BXO-2	HA-4	DAI-6			
117	-3	256	11.27.01	12.30.01	?-4	CAO-4	HA-1			
					EAC-25		HA-2			
					--	HA-1	HA-1	ESL-13	HS-1	HA-1
118	6	229	11.29.01	11.29.01	DAO-2					
119	11	256	12.02.01	12.02.01	AX-4			DAI-7		
120	-4.5	229	12.02.01	12.05.01	CAO-5		AX-6			
121	11.5	175	12.02.01	12.12.01	HS-1		HS-1	HS-1		--
					HA-2		--	--	HA-1	
122	-10	242.5	12.04.01	12.08.01	BXL-10	HA-2			DAO-2	
123	19	88	12.12.01	12.20.01	DAO-11				--	--
					--	HA-1	HA-1			
124	-10.5	41	12.19.01	12.22.01	DAO-13	DSL-13		DAI-4		
125	3	59	12.20.01	12.20.01	HS-1					
126	19	5	12.22.01	12.25.01	DAO-4			AX-2		
127	16	323	12.22.01	12.29.01	DAI-10			DSO-7		HA-2
					--	HA-1				
128	12	255	12.25.01	12.30.01	DKO-4		CSO-4		CHO-4	HA-1
129	12	233.5	12.25.01	12.30.01	?-1		CAO-3		HA-6	HA-2

Table I (Continued)
 12.27.01 HR-1
 12.30.01 DAO-5 HA-1

130 -6 287 12.27.01
 131 -15 318.5 12.29.01

TABLE II

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	2.8 MB						7.62 TC	5.38 MS	2.4 MB	1.6 MS	2.10 TC	
2					3.28 SB	2.17 FB	8.72 SB	6.54 IHC	2.10 SB	1.1 ZFB		
3	2.19 TC			3.8 SB		2.15 SB		3.30 TC			1.1 MA	4.35 TG
4	2.10 MB		1.1 TC	3.9 TC	3.34 TG	4.21 TG		3.28 MS	1.3 SB	2.17 ZFB		
5	1.14 TG		1.2 MB	3.12 MS	2.25 MS	5.34 SB	9.83 ZFB	3.45 MS	1.1 TG	1.20 TC		4.36 TG
6	2.6 MS		1.3 FB	3.13 FB		5.47 TC	7.68 ZFB		1.2 ZFB	1.17 MS		4.23 TC
7			2.5 MB	3.12 TG		6.49 MS	5.80 MS	4.20 MS	1.1 TG			
8	2.1 ZFB			4.16 MB	3.25 ZFB	5.40 FB	5.73 MB	5.16 ZFB	2.7 ZFB	1.10 MB		
9	2.8 MS		3.20 MS	3.17 TC	3.52 MB	4.41 MS	4.9 TG	2.8 TG	1.2 TG	1.2 TG	1.2 ZFB	2.4 TG
10	2.4 SB		3.22 FB	3.16 MS	6.51 TG		3.37 MS	2.3 TG	2.25 TC	3.5 ZFB		
11	3.12 MS			1.9 SB	7.61 ZFB	4.42 FB	3.22 SB	4.4 ZFB	2.42 MB			
12	4.29 MS		3.37 TC	3.12 FB	3.13 MS	3.32 MB	3.16 TG	3.6 TG	1.55 TC			
13	3.37 FB		3.28 TG	4.11 TG	4.28 SB	2.19 IHC	4.19 TG	2.11 ZFB	3.76 SB	0.0 MS		4.16 TC
14				4.15 MS	4.23 TC		4.10 ZFB	2.20 TG	1.61 TC	1.1 TG		
15			3.16 MS		3.23 MB	4.13 MB	2.13 SB	2.19 ZFB	1.37 MB		2.22 IHC	
16			2.13 TG	3.14 MS	3.27 TC	4.24 TG	1.5 MS	2.18 ZFB			1.29 MB	
17			2.14 FB		2.24 MS	4.41 SB	0.0 MS	2.15 MB		1.1 TG		
18			2.17 FB	3.16 MB	2.15 FB	2.31 MB	0.0 MS	2.6 MS	3.23 ZFB			
19			1.10 SB	3.7 TG			1.2 TC	3.23 MS	2.10 TC	1.2 MB	1.19 TC	
20	3.13 TG			3.6 MS	1.1 SB	2.20 TC	0.0 SB	5.33 ZFB	1.7 SB	1.6 ZFB		3.15 IHC
21	4.27 MS		2.14 SB	2.2 MS		2.30 FB	0.0 IHC		1.14 TC	1.5 TG	2.8 ZFB	4.16 SB
22			4.17 FB		2.6 TG		1.2 MS	2.39 TG	1.11 MB	0.0 TG	2.12 MA	
23	3.7 MB		2.28 TG		2.6 SB	3.9 TG	1.4 TC	2.36 TC		0.0 SB		3.18 ZFB
24	3.3 SB		3.41 MS	0.0 MB	2.23 TC	1.2 ZFB	2.9 SB	3.36 MB		0.0 MA		
25			4.38 TC	1.2 TC		0.0 TC	1.12 TC	3.30 IHC	2.5 TC			
26			2.10 MB	1.8 MS		0.0 TG	1.16 SB	3.25 MS	3.5 IHC	0.0 SB	2.8 MB	5.15 TG
27				2.9 FB	2.23 TC		1.11 IHC	3.26 TC	2.4 ZFB		2.8 ZFB	5.11 MB
28				2.20 TG			2.12 IHC	4.25 ZFB		0.0 MA	2.5 IHC	
29						5.11 ZFB	3.16 TC	4.18 TC			3.10 MB	5.17 MB
30					4.22 MB	5.38 MS	3.27 MS	3.27 MS	1.2 ZFB			4.5 TC
31							4.40 TC	3.20 SB				

TABLE III

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	--	28	--	--	--	--	132	88	24	16	30	--
2	--	--	--	--	58	37	152	114	30	11	--	--
3	39	--	--	38	--	35	--	60	--	--	11	75
4	30	--	11	39	64	61	--	58	13	37	--	--
5	14	--	12	42	45	84	173	75	11	30	--	76
6	26	--	13	43	--	97	138	--	12	27	--	63
7	--	--	25	42	--	109	130	60	11	--	--	--
8	12	--	--	56	55	90	123	66	27	20	--	--
9	28	--	50	47	82	81	106	49	28	12	12	24
10	24	82	52	46	111	--	67	23	45	35	--	--
11	42	114	--	19	131	82	52	44	62	--	--	--
12	69	90	67	42	43	62	46	36	65	--	--	--
13	67	--	58	51	68	39	59	31	106	0	--	56
14	--	57	--	55	63	--	50	40	71	11	--	--
15	--	--	46	--	55	53	33	39	47	--	42	--
16	--	--	33	44	57	64	15	38	--	--	39	--
17	--	91	34	--	44	81	0	35	--	11	--	--
18	--	--	37	46	35	51	0	26	53	12	--	--
19	--	48	20	37	--	--	12	53	30	12	29	--
20	43	--	--	36	111	40	0	83	17	16	--	45
21	67	28	34	22	--	50	0	--	24	15	28	56
22	--	35	57	--	26	--	12	59	21	0	32	--
23	37	38	48	--	26	39	14	56	--	0	--	48
24	33	20	71	0	--	12	29	66	--	0	--	--
25	--	24	78	12	--	0	22	60	25	--	--	--
26	--	--	--	18	--	0	26	55	35	0	28	65

Table III (Continued)

27	--	--	29	43	0	21	56	24	0	--	--
28	--	--	40	--	11	32	65	--	0	28	61
29	--	--	--	--	61	46	58	--	--	25	--
30	--	--	--	62	88	57	--	12	--	40	67
31	--	--	--	--	--	80	50	--	--	--	45
Mean	38	55	41	37	62	53	56	35	13	29	57

TABLE IV

Evolution Type	A	B	C	D	E	F	H	?	Total
Number of Groups	42	10	55	186	51	10	229	41	624
Percentage of Numbers	6.7	1.6	8.8	29.8	8.2	1.6	36.7	6.6	100

Observers : MA, MS : Melahat Sirma Aslan
 MB : Mevlana Başal
 SB : Selçuk Bilir

ZFB : Z. Funda Bostancı
 TÇ : Taşkın Çay
 İHÇ : İpek Hamami Çay

TG : Tolga Güver