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SEVENTEEN NEW FLARE STARS IN THE PRAESEPE-REGION

We have continued the survey for flare stars in the region of the Praesepe cluster initiated by G. Haro and E. Chavira (1, 2) and L. Rosino (3).

The observations centred at $RA = 8^h 37^m 05^s$, $D = 19^{\circ} 51'$ (1950) have been carried out with the Schmidt telescopes of the Byurakan Observatory (40" and 21" telescopes) and the Konkoly Observatory (24"). 17 new flare stars have been discovered during 247,8 hours of effective coverage. One (No.4 Haro) of the already known stars showed three more flares.

The intention of this communication is to report briefly about the observations.

Table 1 gives some data concerning the used telescopes and the plate-filter combinations.

Table 1

Tel.	Scale	Field □°	Plate-filter combinations	Average limiting magnitudes	
				u	pg
40"	97"/mm	16.3	Kodak 103a0 Orwo ZU-2 UG-2 2mm	Kodak 103a0 Orwo ZU-2	17.8 18.0
24"	112"/mm	17.2	Kodak 103a0 UG-1 1mm	Kodak 103a0	17.2 17.3
21"	114"/mm	22.6	-	Kodak 103a0 Orwo ZU-2	- 16.7

The method of observations was the common one of multiple and equal exposures of 4,5 or 10 minutes in pg and 10 minutes in U.

Table 2 shows the distribution of effective observational times, the number of the exposures, the number of the plates as well as the number of the discovered flares for each telescope.

Table 2

	40" telescope				21" telescope		24" telescope		Total
	Synchr. with 21"				Synchr. with 40"				
	pg	u	u	Sp	pg	pg	pg	u	
Obs. time	23 ^h 15 ^m	44 ^h 05 ^m	15 ^h 51 ^m	1 ^h 40 ^m	109 ^h 25 ^m	17 ^h 31 ^m	19 ^h 52 ^m	33 ^h 50 ^m	265 ^h 20 ^m
Numb. of exp.	279	255	95	10	1144	105	293	203	2384
Numb. of plates	52	54	17	5	156	19	38	26	367
Numb. of flares	2+1*	4	1***	-	7	1***	2	3+1*	20

Remark: * The same flare star.
 *** The same flare star.

Table 3 gives some data of the observed flares as follow:
 Column 1. The serial number of the flare stars discovered at the Byurakan (By) and Konkoly (K) Observatories.
 Column 2 and 3. Coordinates for 1950.
 Column 4. The approximate photographic magnitudes at minimum.
 Column 5. The observed amplitude of the flare in pg or in U light.
 Column 6 and 7. The date of the flare-up and the telescope used.

Table 3

Designation	RA	D	mpg	Δmpg	Date of flare-up	Telescope
	1950.0					
By 1	8 ^h 33 ^m 9	19 ^o 29'4	17.9	3.3	22.03.1971	21"
By 2	40.5	19 22.9	19.1	2.6	22.04.1971	40"
By 4	39.2	20 7.9	17.5	1.4	10.02.1972	21"
By 5	39.7	18 44.6	17.4	1.2	10.02.1972	21"
By 6	29.7	19 34.7	16.1	0.9	13.02.1972	21"
By 7	44.5	19 37.6	18.0	1.9	13.02.1972	21"
By 8	27.7	19 12.3	15.6	0.7	09.03.1972	21"
K 2	38.3	17 59.7	18.5	1.0	14.03.1972	24"
By 9	35.7	21 56.5	16.6	3.4u	17.03.1972	40", 21"
By10	38.3	18 56.0	18.3	0.8	19.03.1972	40"
By11	40.0	18 24.9	18.6	2.5	06.04.1972	21"
By12	41.2	21 14.7	18.2	2.0u	05.01.1973	40"
By13	44.9	18 32.4	18.3	3.9u	07.01.1973	40"
K 3	35.7	19 26.1	18.9	4.8u	29.01.1973	24"
By14	38.6	18 24.8	17.3	2.8u	27.02.1973	40"
By15	38,7	18 55.5	18.4	1.9	05.03.1973	40", 24"
=K 4						
K 5	39.7	20 52.5	15.3	1.6u	24.03.1973	24"

Table 4 shows the repeated flares of the star No. 4 of Haro's list (2).

Table 4

Designation	RA 1950.0	D	mpg	Δ mpg	Date of flare-up	Tele- scope
K 1] By3] =No.4 Haro	8 ^h 37 ^m .9	18 ^o 35'2	18.9	1.6	21.01.1972	24"
				4.3u	29.11.1972	24"
				4.7u	10.02.1973	40"

Our observations augment the number of the known flare stars in the Praesepe region to thirty. One of them (No. 4 of Haro's list) is probably not a cluster member as the difference between its positions on the Palomar Sky Survey and on our plates reveals a rather large proper motion for this star.

At present the total effective coverage for the Praesepe cluster is about 390^h (1,2,3 and this paper).

Three or more flare-ups of the same star have not been observed (exception No. 4 Haro).

A short calculation according to the formula given in (5) suggests that the number of flare stars in the Praesepe cluster must be close to

$$N = \sum_k n_k = 146 \quad (k = 0, 1, 2, \dots)$$

Coming out from the earlier experience (4, 5, 6, 7) it is probable that the number of flare stars in Praesepe calculated in this way is close to the real one.

Already these preliminary results show a lower flare activity in the Praesepe cluster than in the Pleiades.

Details of our observations, identification charts, light curves of the flares and discussions will be published in forthcoming papers.

I. JANKOVICS

Byurakan and Konkoly Observatories

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