

# VARIABLE STAR BULLETIN

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## PHOTOGRAPHIC OBSERVATIONS OF ECLIPSING OF AS 338

M. Wakuda (Ryuyo, Shizuoka)

The variability of this star was detected on the patrol plates in 1983 and was found later to be an eclipsing system of fairly long period.

The star was photovisually observed by my colleagues and contributed their results for this paper. The names and instruments of the observers are as follows.

M. Huruhata	18cm and 25cm Schmidt camera
S. Fujino	31cm Schmidt camera
T. Saito	21cm reflector
M. Wakuda	20cm reflector, f 40cm lens

The star is listed in the catalog of symbiotic stars as AS 338 whose position is given as follows.

$19^{\text{h}}01^{\text{m}}32^{\text{s}}$   $+16^{\circ}21'.8$  (1950.0)

The results of observations are given in Figure 1, in which markings of observers are as follows.

Huruhata (dots), Fujino (open circles), Saito (triangles),  
Wakuda (crosses).

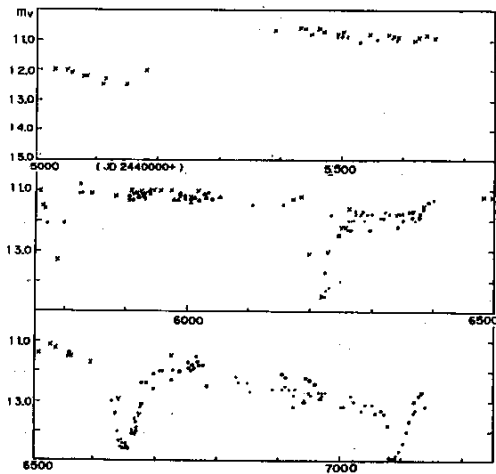


Fig. 1. Light variation of AS 338 in 1982-1988.

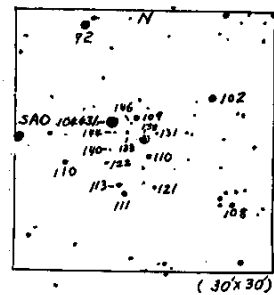


Fig. 2. Finding chart.

From the figure, four eclipsings are well determined, and the following formula is obtained with very small values of  $O-C$ 's.

$$\text{Min} = \text{JD } 2445784 + 434 \text{ days} \cdot E$$

The minima is fairly deep, almost amounting to four magnitudes, and the total range is 10.5 - 15.0  $m_v$  so far. It is noticeable that the variation of outside eclipse is fairly big, but no secondary minimum can be recognized.

A finding chart is shown in Figure 2 in which the  $v$ -magnitudes of comparison stars measured by Dr. Huru-hata are given without decimal points. I am indebted to my colleagues for presenting their observations.

### CY URSAE MAJORIS - A NEW SU UMA SYSTEM WITH ULTRASHORT ORBITAL PERIOD

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M.Iida (Nagano), N.Makiguchi (Kanagawa)  
M.Koshiro (Suwa)

CY UMa was discovered by Goranskij (1977), who reported an outburst in February, 1977. The star was classified as a dwarf nova with moderately large amplitude. No further information has been available.

Another outburst was caught on January 6, 1988 at 12.3  $m_v$  by one of the authors (IAU Circ. No.4526). The brightness declined linearly to 13.4 on January 13, followed by rapid decline. The light curve resembles a supermaximum of SU UMa type dwarf nova (Fig.1).

On January 8, short-term variation was visually detected by Kato. From January 10, systematic observation was carried out photovisually by Fujino using 31cm Wright-Schmidt camera and visually by Iida, Kato, Makiguchi and Koshiro, 26cm, 20cm, 15cm and 31cm reflectors respectively. Total number of magnitude estimations was 830. Short-term variation was present in the whole course of outburst. However, it is difficult to determine accurate timings of maxima because the range of variation was small and the light curve has some irregularity. The results are summarized in Table 1. All maxima are fairly well represented by the period about 0.06 days, without any possibility of one day aliases. Period analysis using all estimations gives strong periodicity of 0.0593 days (uncertainty 0.0003 days), which corresponds to the superhump period of the system. On January 14, the star was at 14.2 mag in average, but a trace of periodicity persisted with marked irregularity. Such behavior was seen in the case of SW UMa (Robinson et. al. 1987). Mean light curve constructed from all observations is given in Fig.2. No apparent eclipses were detected.

The characteristics of the gross light curve and the existence of the periodic change of brightness in outburst strongly support the classification of the variable as an SU UMa type dwarf nova. Using the empirical relationship between the orbital period and the superhump period, the orbital period of this system is expected to be around 0.058 days, which is the third shortest known period of dwarf novae, excluding unreliable case AF Cam. The shortest members include WZ Sge and SW UMa, both of which are extremely supermaximum predominant systems. CY UMa has possibility to occupy the gap between classical SU UMa systems and these extremes.

Table 1.

1988 Jan.UT	Obs.	Method	E	O-C(days)	1988 Jan.UT	Obs.	Method	E	O-C(days)
8.595:	Ka	vis	-49	0.001:	11.672	F	pv	3	-0.005
9.791	M	vis	-30	-0.002	11.674	I	vis	3	-0.003
10.608	Ka	vis	-15	-0.002	11.792	I	vis	5	-0.004
10.653	Ka	vis	-14	-0.016	13.471	Ka	vis	33	0.015
10.839	M	vis	-11	-0.008	13.519	F	pv	34	0.003
11.490	F	pv	0	-0.010	13.523	I	vis	34	0.007
11.557	F	pv	1	-0.002	13.585	I	vis	35	0.010
11.614	I	vis	2	-0.004	13.644	I	vis	36	0.010
11.629	F	pv	2	0.011	14.583	Ka	vis	52	0.000

O-C's are calculated using the following formula:  
 $\text{Max.UT} = \text{Jan.11.500} + 0.0593E$

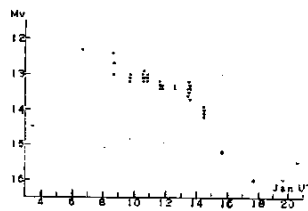


Fig. 1. Light curve of CY UMa in Jan.1988.

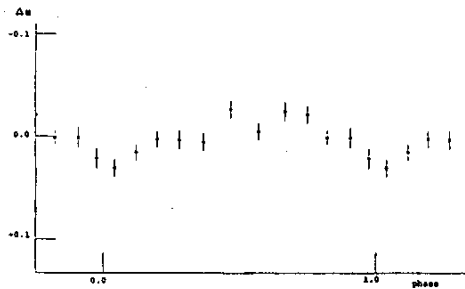


Fig. 2. Mean light curve of CY UMa reduced by the period of 0.0593days. Each dot represents average of 70 observations and vertical line represents standard error.

References:

- Goranskij, V.P., 1977, *Astronomicheskij Tsirkulyar* No.942.  
 Max Planck Institut fur Physik und Astrophysik, *Catalogue of cataclysmic Binaries, Low-mass X-ray Binaries and Related Objects*, 4th Ed.  
 Robinson, E.L., Shafter, A.W., Hill, A.J., Wood, M.A., Mattei, J.A., 1987, *Ap.J.*, 301, 252.

A POSSIBLE NEW MIRA TYPE VARIABLE  
IN TAURUS

M. Huruhata (Gotenba)

On about 170 plates taken for InT stars with 25 cm Schmidt camera between 1984 and 1987, a new variable of possibly Mira type was found. The position is  $4^h43^m29^s, +17^{\circ}17'.6$  (1950). The light curve is shown in Figure 1, and the finding chart in Figure 2.

The range was  $13.8 - <15.5$   $m_v$  so far, and the period was around 380 days. In the finding chart,  $m_v$  of comparison stars are shown without decimal points.

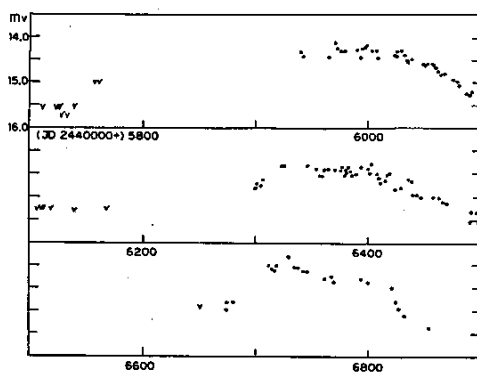


Fig. 1. Light curve in 1984-87.

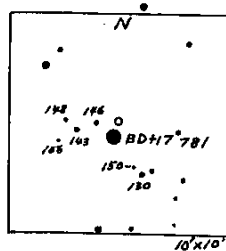


Fig. 2. Finding chart.

VARIABLE STAR OBSERVERS LEAGUE  
IN JAPAN

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