COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS
Number 4874

Konkoly Observatory
Budapest
3 April 2000
HU ISSN 0374 – 0676

THE VARIABLE PERIOD OF RY CANIS MINORIS

BAV MITTEILUNGEN NR. 127

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RY CMi = GSC 177.1211 = 283.1928 was discovered by Hoffmeister (1930). He announced it as an eclipsing variable of Algol type between $11\overset{m}{.}9$ and $14\overset{m}{.}9$ (pg) and a period of $3\overset{d}{.}2654$. Further investigations made by Kukarkin (1930) were used by Rügemer (1932) to refine the elements to:

$$\text{Min I} = \text{HJD } 2425323.51 + 3\overset{d}{.}265211 \times E. \tag{1}$$

With these elements, RY CMi is listed in the fourth edition of the GCVS (Kholopov et al., 1985, 1999).

Visual and CCD observations in the last decade made by Borovicka (1993), Diethelm (1996), Locher (1989, 1990) and Paschke (1988, 1989, 1992, 1993) yielded however large $O - C$ values.

Williams (1996) made a survey using old Harvard plates covering the years after the observations of Hoffmeister. He derived times of normal minima to improve the ephemeris (1) to:

$$\text{Min I} = \text{HJD } 2427478.559 + 3\overset{d}{.}265222 \times E. \tag{2}$$

In order to check the long-term behaviour of the period and to bridge the gap between the Harvard plates and the CCD measurements, additional observations on 272 sky patrol plates of Sonneberg Observatory were performed by T.B. They cover a time interval between J.D. 2438004 and 2450428.

All minima published until today together with the newly found ones are listed in Table 1; Figure 1 gives the corresponding $O - C$ diagram according to elements (2).

Assuming two consecutive constant periods, the following set of linear elements can be derived by least squares fitting:

From JD 2425000 (approx.) to JD 2437500 (approx.):

$$\begin{array}{l} \text{Min I} = \text{HJD } 2427478.578 + 3\overset{d}{.}265204 \times E. \\ \qquad\qquad\qquad\quad \pm 19 \qquad\quad \pm 24 \end{array} \tag{3}$$

From JD 2437500 (approx.) to JD 2450150 (last observed minimum):

$$\begin{array}{l} \text{Min I} = \text{HJD } 2449031.410 + 3\overset{d}{.}264998 \times E. \\ \qquad\qquad\qquad\quad \pm 24 \qquad\quad \pm 4 \end{array} \tag{4}$$

Table 1: Minima of RY CMi according ephemeris (2)

HJD	Epoch	$O-C_2$	Method	Weight	Observer
25323.47	−660	−0.04	pg	1	Hoffmeister
25346.37	−653	0.00	pg	1	Hoffmeister
25532.63	−596	0.14	pg	1	Hoffmeister
25643.47	−562	−0.03	pg	1	Hoffmeister
25653.38	−559	0.08	pg	1	Hoffmeister
27419.778	−18	−0.007	pgN	1	Williams
27478.612	0	0.053	pgN	1	Williams
30750.309	1002	−0.002	pgN	1	Williams
31504.590	1233	0.012	pgN	1	Williams
31850.667	1339	−0.024	pgN	1	Williams
38387.480	3341	−0.186	pg	2	Berthold
38472.379	3367	−0.182	pg	1	Berthold
38671.581	3428	−0.159	pg	2	Berthold
40150.625	3881	−0.261	pg	1	Berthold
41332.528	4243	−0.368	pg	2	Berthold
41391.350	4261	−0.320	pg	1	Berthold
44166.542	5111	−0.567	pg	1	Berthold
44251.466	5137	−0.538	pg	2	Berthold
45407.350	5491	−0.543	pg	1	Berthold
46360.612	5783	−0.726	pg	1	Berthold
47170.40	6031	−0.71	visN	2	Paschke
47206.31	6042	−0.72	pg	2	Paschke
47552.413	6148	−0.731	vis	5	Locher
47591.57	6160	−0.76	visN	5	Paschke
47921.330	6261	−0.784	pg	1	Berthold
47970.352	6276	−0.740	vis	2	Locher
48698.355	6499	−0.882	CCDN	5	Paschke
48982.417	6586	−0.894	pg	2	Berthold
49031.382	6601	−0.907	pg	2	Berthold
49031.385	6601	−0.904	CCD	10	Borovicka
49031.390	6601	−0.899	CCD	10	Paschke
50151.339	6944	−0.922	CCD	5	Diethelm

Remark: 'N' refers to normal minima

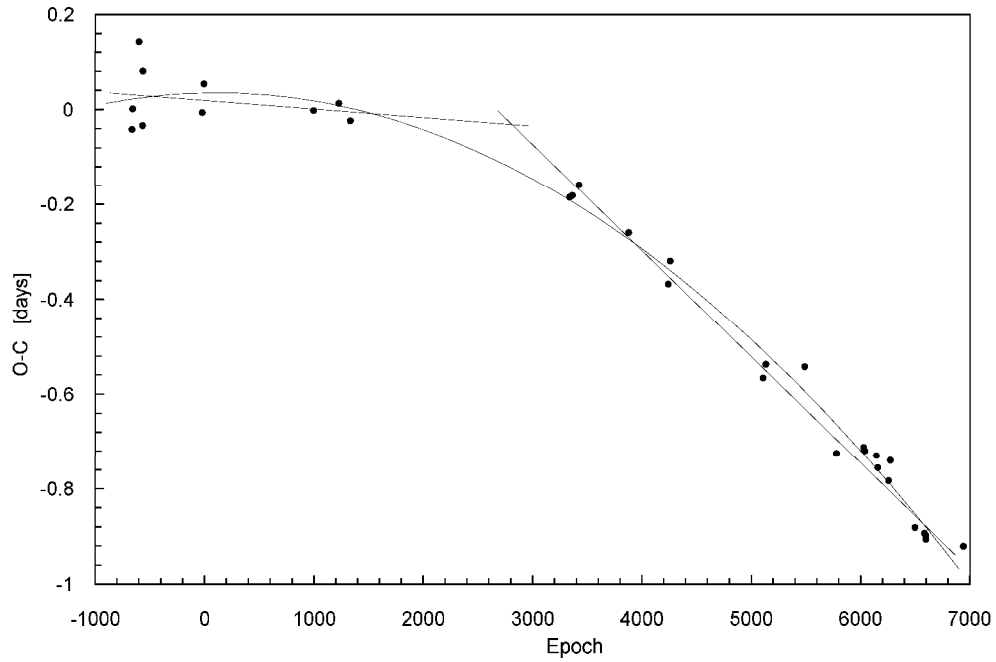

Figure 1. $O-C$ diagram of the available minima according to ephemeris (2).

Alternatively, a weighted quadratic least squares fit is also possible to achieve, yielding the following elements:

$$\begin{array}{c} \text{Min I} = \text{HJD } 2427478.594 + 3^{\text{d}}.265227 \times E - 2.18 \times 10^{-8} \times E^2. \\ \qquad\qquad\quad \pm 11 \qquad\quad \pm 7 \qquad\quad \pm 10 \end{array} \tag{5}$$

Based on the quadratic elements we can derive the rate of the period change as $dP \sim -4^{\text{d}}.36 \times 10^{-8}$ per orbital revolution.

The observed changes in period make RY CMi an interesting case to which more attention should be paid. In spite of the brightness and the large amplitude of the star, neither a photoelectric observed light-curve nor any spectral data are available. We therefore suggest spectroscopy and multicolour CCD photometry of this object.

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