

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

Number 5652

Konkoly Observatory  
Budapest  
5 October 2005

*HU ISSN 0374 – 0676*

**ADDITIONAL DATA FOR 69 VARIABLES**

HOOGEVEEN, GEERT J.

Werkgroep Veranderlijke Sterren, Koninklijke Nederlandse Vereniging voor Weer- en Sterrenkunde;  
email: gertho@xs4all.nl

The General Catalogue of Variable Stars (Kholopov et al., 2004) still contains many variables for which the elements are completely or partly unknown. In the New Catalogue of Suspected Variable Stars (NSV) (Kukarkin, Kholopov, 1982) and its supplement (Kazarovets, Samus, Durlevich 1998) there are another 25000 variables – approximately – that need further investigation. In this investigation, a group of variables was selected from the GCVS and some from the NSV and supplement catalogues to find the elements, or additional elements for them.

Data from the ASAS-3 database (Pojmanski, 2002), as well as from NSVS (Wozniak et al., 2004) and Hipparcos (Perryman et al., 1997) were used. In 15 cases a combination of data was used to make a better analysis possible. Hipparcos magnitudes were transformed to the V system (Otero, 2001).

NSVS magnitudes were shifted to match the maximum light of the ASAS-3 data for these variables. For 2 cases the ASAS and NSVS magnitudes were shifted to match the maximum light of the Hipparcos observations.

In almost all cases ASAS-3 data were used from the diaphragm appropriate for the magnitude of the variable. Only in the case of DV Cen a set of data from another diaphragm was used to avoid contaminated data. In all cases only data with “A” and “B” status in ASAS-3 were used. Flagged NSVS and Hipparcos data were avoided as well. Elements for the variables were found with AVE (Barbera, 1999).

Data for the selected stars were taken from the online version of the GCVS, to ensure most recent data on positions of the variables.

Identification in ASAS-3 was done by limiting the search radius in ASAS-3 query field to 5 arcseconds. In a few cases the search radius needed to be expanded to 10 or 15 arcseconds, before a matching star in the ASAS-3 database was found. These stars are labeled in Table 1 with 1 and 2 asterisks respectively following the name of the variable. A search radius bigger than 15 seconds was considered an identification issue, that would need resolving before continuing the investigation. Only 12 variables needed a 15 arcseconds search radius.

Similarly, identifications in NSVS were done by using a search radius of 6 arcseconds. No bigger search radius was needed here.

All variables were identified in VizieR by their matching GSC numbers (see Table 2). In four cases, where there was no GSC identification, the UCAC2 catalogue in VizieR was used for identification.

As many of the variables as possible were identified by their original identification chart as well, but this was not possible for all. In total, of the 69 variables in Table 1, the position of 40 of them could be checked by using the original identification chart. In case the identification created a problem some comments were added in the Remarks section of this publication.

Data from ASAS-3, NSVS and Hipparcos were transferred to Excel, and then into AVE for analysis. Many light curves exhibit an unusual amount of noise and many secondary minima are not well defined. General problems with the ASAS-3 system, faintness or contamination by close neighbouring stars are the main cause.

In many cases there are observed minima in the original discovery publications, but it was not attempted to link them to the present newly found elements. A period with 5 significant digits, cannot be used to connect with minima observed in the 1930's or 40's.

**Table 1.**

Name	Type	Epoch	D	e	Period	Magnitude
SS Aps*	EB	51902.135			0.582665	13.30–14.04 (13.63)
WX Aps	EA	51876.706	7.0		4.696797	11.42–13.14 (11.48:)
AY Aps	EA	51911.256	10.8		1.28707	12.51–14.09
BV Aps	EA	51868.275	9.1		1.6469	12.39–13.21
V447 Ara**	EA	51936.878	3.2		18.146	12.86–13.99
V502 Ara*	EA	51941.311	8.1		2.41155	13.41–14.44
V530 Ara	EA	51934.900	11.8		3.6383	12.00–13.59
V562 Ara	EA	52026.679	8.1		3.08214	13.72–14.46
V760 Ara*	EA	51948.501	8.1		5.5851	12.09–13.04
V871 Ara	EA	51922.306	2.2		9.4166	10.97–12.59
CP Aur	EA	51274.800	8.1		2.7645	13.22–14.74*
KL Aur	EA	51275.200	8.6		3.195	13.34–15.13*
V534 Aur	EA	51278.940	5.4		2.14186	10.43–10.76
SY Boo	EB	51273.620			0.714490	12.25–12.87 (12.46:)
AI Cap	EA	51978.995	10.8		3.08367	12.16–13.53
KP Car	EA	51873.670	5.9		12.1910	11.09–12.74
PW Car	EA	51868.407	9.7		2.914	13.14–14.45
V518 Cas	EA	51364.700	4.3		6.312	11.06–11.37 (11.23)*
AE Cen	EA	51871.285	10.8		2.11510	12.25–14.15 (12.38:)
DV Cen	EA	51885.318	10.8		1.20591	11.62–12.75 (11.90)
V406 Cen*	EA	52404.440	5.4		5.667	12.21–12.64 (12.51:)
V413 Cen*	EA	51900.518	8.1		4.011	9.80–10.26
TX Cha	EA	51868.420	12.7		0.901636	13.08–14.00
RR Cir*	EB	51905.235			1.09173	11.51–12.78 (11.89)
UX Cir	EA	51903.398	10.8		1.48124	11.95–12.79
VY Cir	EA	51901.832	4.3		4.68708	12.60–13.32 (13.11)
AW Cir	EA	51912.141	4.8		17.312	10.88–11.88 (11.14:)
RR Col	EA	51863.210	2.7	0.538	12.6248	11.07–11.36 (11.34)
ST Col	EA	51880.322	10.8		2.22129	11.43–12.31 (11.56:)
V359 CrA	EA	51950.690	9.1		2.5525	12.02–12.78
V445 CrA	EA	51960.063	13.1		1.45437	12.49–13.36
V703 Cyg	EA	51289.180	8.1		4.1473	12.79–14.43 (13.05:)*
V1774 Cyg	EA	51277.001	11.8		2.4571	12.78–14.17 (12.98:)*
V1909 Cyg	EB	51295.473			3.0947	13.09–13.78 (13.50:)*
DF Dra	EW	51277.800			2.80705	13.06–13.65 (13.54)*
SV Gru	EA	51873.197	9.7		1.35939	11.96–14.16
BD Hyi	EA	51871.340	9.7		2.18187	12.88–14.36
GI Lib	EA	51915.303	8.1		2.08955	12.12–13.79 (12.27:)
TU Lup	EA	51914.900	9.7		2.9378	12.87–14.05 (13.14:)
ZZ Lup	EA	51915.098	7.0		4.5564	12.93–14.33
AB Lup	EA	51912.778	5.4		5.2934	12.29–13.06
GT Lup	EA	51916.390	10.8		1.60222	11.74–12.65 (11.85:)

Table 1 (cont.)

Name	Type	Epoch	D	e	Period	Magnitude
V481 Lyr	EA	51276.350	8.6		7.227	13.01–14.30 (13.28:)*
SW Men	EA	51867.259	10.8		1.41461	12.17–13.09 (12.40:)
CY Oph	EA	51931.924	3.8	0.296	16.355	10.59–11.09 (11.01)
FG Oph	EA	51938.452	8.6		2.10375	12.23–12.84
V983 Oph	EA	52092.359	1.6	0.731	8.4449	10.06–10.45 (10.43)
V1065 Oph	EB	51274.591			9.8570	11.99–12.84 (12.32)
V1027 Ori	EA	52626.300	1.6	0.559	10.3938	10.55–11.21 (11.14)
BB Pav	EA	51946.880	9.8		1.697525	12.99–13.81
BO Pav	EA	51873.102	2.7	0.532	19.2315	9.39–10.25 (9.78)
EY Pav	EA	51869.730	2.2	0.688	15.321	11.94–12.65 (12.21:)
QU Pav	EA	51869.024	2.2	0.392	9.1825	11.53–11.90 (11.82)
V379 Per	EA	51421.080	16.1		3.1985	12.65–13.41 (12.85)*
SW PsA*	EA	51868.730	12.9		2.34921	10.81–13.63 (10.85:)
KK Pup	EA	51869.510	5.4		10.0404	11.68–12.31
OQ Pup	EA	51874.076	8.1		13.07	11.72–13.85 (11.87:)
RY Pyx	EA	51870.279	10.8		1.62182	11.54–12.41 (11.67:)
DM Sgr*	SR	52713.000			132.3	11.1 –14.6
V4727 Sgr	EA	51956.951	11.8		2.99719	11.58–12.54
V761 Sco	EA	51924.669	9.7		3.8877	11.86–14.00 (11.87:)
V1067 Sco	EA	47926.150	2.7	0.430	12.0424	10.55–10.94 (10.83:)
SS Ser**	EA	51954.850	8.1		7.8630	12.84–14.07
WZ TrA**	EA	51921.581	10.8		2.03749	12.50–13.67
CK Vel	EA	51882.331	1.6		17.5125	11.71–12.26
EG Vel**	EA	51872.921	8.1		4.8927	11.76–13.55
GT Vel	EA	51874.580	3.8	0.581	4.67007	9.68–10.63 (9.90)
NSV 5499	CW	51272.640			6.395	10.36–10.77*
NSV 25346	EA	52754.379	9.1		7.125	10.96–11.47

In Table 1, the photometric data are presented as follows:

Column 1 Name of the variable

Column 2 Type of variability

Column 3 Epoch of primary minimum for eclipsing binaries, or maximum light for others

Column 4 Duration of the eclipse as percentage of the period

Column 5 Eccentricity of the system, given as a fraction of the period between primary minimum and secondary minimum

Column 6 Period in days

Column 7 Magnitude range in V (in ROTSE1 for NSVS variables, indicated by \* in Table 1), secondary minimum in brackets, derived from folded light curve

Table 2.

Name	Other id	GSC/UCAC2	ASAS/NSVS	NSVS/HIP
SS Aps*	HV 5094	GSC 09265-01104	ASAS 143429-7255.7	
WX Aps	S 4985	GSC 09256-01845	ASAS 141532-7415.6	
AY Aps	S 5536	GSC 09433-01119	ASAS 155815-7738.6	
BV Aps	S 5572	GSC 09450-01461	ASAS 162809-7957.7	
V447 Ara**	S 6036	GSC 08734-02381	ASAS 170256-5623.8	
V502 Ara*	S 6119	2UCAC 08136018	ASAS 171429-5455.5	
V530 Ara	S 7639	GSC 08350-00729	ASAS 172800-4916.6	
V562 Ara	S 8679	2UCAC 07890784	ASAS 174923-5519.3	
V760 Ara*	S 7649	GSC 08348-00855	ASAS 174930-4826.8	
V871 Ara		GSC 08329-03364	ASAS 163723-4842.2	
CP Aur	AN 1933.0342	GSC 02929-00693	NSVS 4536784	
KL Aur	S 8010	GSC 03386-00676	NSVS 4496038	
V534 Aur		GSC 01887-01240	ASAS 062624+2756.7	NSVS 7107371
SY Boo	HV 3680	GSC 01471-00505	ASAS 141240+1732.4	NSVS 10513199
AI Cap	BV1640	GSC 05744-01730	ASAS 201728-1057.7	NSVS 17107469
KP Car	S 4929	GSC 09218-00938	ASAS 101330-7241.5	

Table 2. (cont.)

Name	Other id	GSC/UCAC2	ASAS/NSVS	NSVS/HIP
PW Car	S 6356	GSC 09237-00157	ASAS 111809-7434.8	
V518 Cas		GSC 03698-01119	NSVS 1786136 /1835836/1862650	
AE Cen	AN 1920.0047	GSC 08636-01713	ASAS 120256-5513.1	
DV Cen	HV 4746	GSC 08662-01937	ASAS 132419-5329.1	
V406 Cen*	HV 6471	GSC 02357-01517	ASAS 134130-6355.7	
V413 Cen*	HV 6502	GSC 08677-02964	ASAS 140440-5853.5	
TX Cha	S 6333	GSC 09422-01073	ASAS 110201-8124.7	
RR Cir*	HV 5038	GSC 09016-01958	ASAS 135034-6657.9	
UX Cir	HV 5072	GSC 09244-00568	ASAS 141559-6739.2	
VY Cir	HV 5080	GSC 09261-00134	ASAS 142423-6958.0	
AW Cir	S 7619	GSC 09015-00629	ASAS 145011-6432.7	
RR Col	HV 3027	GSC 07082-00760	ASAS 063319-3517.9	
ST Col	S 7613	GSC 07602-00265	ASAS 055904-3927.5	
V359 CrA	HV 11869	GSC 07900-02773	ASAS 181603-3839.1	
V445 CrA	S 7666	GSC 07914-00917	ASAS 183738-4430.5	
V703 Cyg	SVS 1116	GSC 03602-01536	NSVS 3282554/5859166	
V1774 Cyg	LD 23	GSC 03580-00223	NSVS 5776136	
V1909 Cyg	SVS 2379	GSC 02712-00168	NSVS 8717725	
DF Dra	GR 79	GSC 04451-00310	NSVS 1335430/1242151	
SV Gru	S 7701	GSC 07994-00210	ASAS 215849-4419.5	
BD Hyi	BV 1017	GSC 09346-00981	ASAS 001528-7638.1	
GI Lib	BV 1625	GSC 01673-00130	ASAS 150442-1725.1	NSVS 16193460
TU Lup	HV 4665	2UCAC 10434348	ASAS 144341-4950.4	
ZZ Lup	HV 4691	GSC 08293-01190	ASAS 150539-4518.4	
AB Lup	HV 4693	GSC 08305-01956	ASAS 151006-5048.6	
GT Lup	BV 1628	GSC 08695-01062	ASAS 152155-5306.0	
V481 Lyr	WR 115	GSC 03130-00816	NSVS 5502816	
SW Men	S 6723	GSC 09368-00504	ASAS 041950-7748.3	
CY Oph	HV 4272	GSC 06822-02623	ASAS 165606-2821.8	NSVS 19207277
FG Oph	HV 4334	GSC 06815-00950	ASAS 170220-2522.5	NSVS 19266678
V983 Oph	BV 168	GSC 00421-02468	ASAS 175538+0228.7	NSVS 13743670
V1065 Oph	S 8622	GSC 00997-00164	ASAS 173853+1023.5	NSVS 10895577
V1027 Ori	AN 1934.0289	GSC 00742-00125	ASAS 061204+1456.0	NSVS 9688725
BB Pav	HV 9963	GSC 08757-01938	ASAS 183450-5914.5	
BO Pav	S 3312	GSC 09097-00144	ASAS 195017-6547.0	HIP 97605
EY Pav	S 6996	GSC 09314-00065	ASAS 194311-7237.8	
QU Pav	S 6998	GSC 09314-00344	ASAS 194335-7207.1	
V379 Per	S 10161	GSC 08999-01458	NSVS 6707761	
SW PsA*	S 5137	GSC 06960-00669	ASAS 220610-2932.9	NSVS 19906011/19925086
KK Pup	S 8520	GSC 06581-02102	ASAS 082355-2836.6	NSVS 18129350
OQ Pup	BV 663	GSC 08133-02606	ASAS 073819-4602.7	
RY Pyx	AN 1932.0199	GSC 06015-01088	ASAS 083952-1752.1	NSVS 15598307
DM Sgr*	S 5078	2UCAC 18546614	ASAS 193635-3145.1	
V4727 Sgr		GSC 06870-00614	ASAS 183331-2858.8	
V761 Sco	S 7636	GSC 07358-00621	ASAS 164348-3548.4	
V1067 Sco	HD 151831	GSC 06817-01768	ASAS 165059-2646.9	NSVS 19243530/ HIP 82451
SS Ser**	AN 1924.0040	GSC 06234-00597	ASAS 172348-1501.1	
WZ TrA**	HV 5192	GSC 09044-02629	ASAS 160139-6500.4	
CK Vel		GSC 08605-01636	ASAS 103731-5607.7	
EG Vel**	S 4942	GSC 07736-00877	ASAS 105016-4432.2	
GT Vel	BV 1579	GSC 07686-01288	ASAS 091038-4305.0	
NSV 5499	BV 273	GSC 04393-01510	NSVS 2645865/885910	
NSV 25346		GSC 01647-01627	ASAS 204901+1613.8	NSVS 11486002

Information about deviating duration of the secondary minimum, and duration of total eclipse, is given in the remarks section.

The epoch of minimum light was obtained by using the bisected chords method on the folded light curve. For every variable, there is a folded light curve, based on the ASAS-3, NSVS or Hipparcos measurements.

### Remarks

V502 Ara: the position given in the original publication: (1875) 17<sup>h</sup>04<sup>m</sup>16<sup>s</sup>,  $-54^{\circ}46'1$ , is the position of the star 2UCAC08136035, but this is not the star on the identification chart. That is 2UCAC08136018 at 17<sup>h</sup>14<sup>m</sup>28<sup>s</sup>.2,  $-54^{\circ}55'29''.2$ . This is close to the position given by the GCVS and by ASAS and this was adopted for this investigation.

V534 Aur: previously derived period 1.4280d based on part of the light curve in Han (2000). The two minima in this publication seem to confirm these elements. The period could be twice the value given in the table.

V518 Cas: DII=2.7 %. Very steep ascending and descending branches. There could be a short period of totality, but this part of the light curve is not in the data.

DV Cen: Because data from a different diaphragm were used, the magnitudes given could be slightly different from V.

V413 Cen: The period could be twice the value given in the table.

RR Cir: wrongly identified as GSC 09016-01864 in Simbad. That star is also slightly variable according to the ASAS-3 data.

RR Col: DII=2.8 %. Reported as 'missing' by Dvorak (2004). Primary and secondary minima are almost equally deep, so the primary minimum could be the secondary.

DF Dra: Very distorted light curve.

TU Lup: Very steep ascending and descending branches. There could be a period of totality, but this part of the light curve is not in the data.

CY Oph: Reported as 'missing' by Dvorak (Dvorak, 2004). Duration of secondary minimum is very short, it needs to be observed properly.

FG Oph: The period could be twice the value given in the table.

V983 Oph: Primary and secondary minima are almost equally deep, so the primary minimum could be the secondary. Only five measurements during minima.

V1027 Ori: DII=4.8%. Identification chart in Olijnik (1963) has wrong scale written in chart. Primary and secondary minima are almost equally deep, so the primary minimum could be the secondary.

KK Pup: The period could be twice the value given in the table.

DM Sgr: =V1162 Sgr. Reported as identical in GCVS, but still have separate positions in Simbad.

V4727 Sgr: Very steep ascending and descending branches. There could be a period of totality, but this part of the light curve is not in the data.

V761 Sco: Finder chart in *Astronomische Nachrichten* is not accurate enough to distinguish between several neighbouring stars. Identification was based on coordinates from GCVS.

CK Vel: Reported as 'missing' by Dvorak (2004). The period could be twice the value given in the table.

GT Vel: DII=3.2%

NSV 5499: Possibly same object as X-ray source RX J1212.2+6853

NSV 25346: The period could be twice the value given in the table.

### Acknowledgements

This research has made use of the Simbad and VizieR databases operated at the Centre de Données Astronomiques in Strasbourg, France, as well as the ASAS-3, NSVS and Hipparcos databases.

I want to thank Richard Huziak, Tom Krajci, Sebastian Otero and Erwin van Ballegoij for their comments in the varying stages of this investigation.

### References:

- Barbera, R., 1999, <http://www.astrogea.org/soft/ave/introave.htm>  
 Diethelm, R., 2001, *IBVS*, 5038  
 Dvorak, S.W., 2004, *IBVS*, 5549  
 Han, J.Y., et al., 2000, *IBVS*, 4908  
 Kazarovets, V., Samus, N.N., Durlevich, O.V., 1998, *IBVS*, 4655, New Catalogue of Suspected Variable Stars, Supplement version 1.0  
 Kholopov, P.N., et al., 2004, *the combined table of General Catalogue of Variable Stars vol I-III*, 4th edition (GCVS4) and Name-Lists of Variable Stars nos. 67-77, <http://www.sai.msu.su/groups/cluster/gcvs/gcvs/iii>  
 Kukarkin, B.V., Kholopov, P.N., 1982, Moscow; Publication Office Nauka, *New Catalogue of Suspected Variable Stars*  
 Olijnik, G.T., 1963, *Tsirk. Astron. Obs. L'vov*, **39-40**, 60  
 Otero, S., 2001, <http://www.konkoly.hu/pub/ibvs/5401/5482-t2.txt>  
 Perryman, M.A.C., et al., 1997, *A&A*, **323**, L49, the Hipparcos Catalogue  
 Pojmanski, G., 2002, *Acta Astronomica*, **52**, 397, The All Sky Automated Survey, <http://www.astro.uw.edu.pl/gp/asas/asas.html>  
 Wozniak, P.R., et al., 2004, *AJ*, **127**, 2436, Northern Sky Variability Survey: Public data release <http://skydot.lanl.gov/nsvs/nsvs.php>

### ERRATUM FOR IBVS 5652

The eccentricity (Min II phase) given for V983 Oph in Table 1 in IBVS 5652 should read 0.269 instead of 0.731.