ASTEROID OBSERVED FROM BASSANO BRESCIANO OBSERVATORY 2012 AUGUST-DECEMBER

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Lightcurves for four minor planets were obtained at Bassano Bresciano Observatory from 2012 August to December: 612 Veronika, 1474 Beira, 1604 Tombaugh, and 1060 Magnolia.

Photometric measurements of four minor planets were obtained at Bassano Bresciano Observatory (565) using the 0.32-m *f*/3.1 Schmidt and Starlight HX-516 CCD camera at prime focus. *Polypus* software v1.8.1 (Bassano Bresciano Observatory, 2010) was used to control the robotic observations. Exposure times for the unfiltered, unguided images were 120 s. Most of exposures were taken when the target's altitude was more than 30°. Due the negative declination of some of the asteroids, some exposures were taken when target's altitude was more than 25°. All raw images were processed with flat field and dark frames. *MPO Canopus* v.10.4.0.20 (Bdw Publishing, 2010) was used to perform differential photometry on the reduced images. Only solar-coloured comparison stars were used in order to minimize colour difference errors by using the Comp Star Selector in *MPO Canopus*. Data were light-time corrected but not reduced to standard magnitudes. The periods reported here were based on those having the lowest RMS error. Night-to-night calibration was done by adjusting the DeltaComp value in MPO *Canopus.* All data have been submitted to the ALCDEF database at *http://minorplanetcenter.net/light_curve.*

612 Veronika. This asteroid was selected in the list by Warner *et al.* (2011a) that indicated that no period had been previously reported. It was observed for eight nights covering a 35-day span. Three sessions were longer than five hours; all these show a very asymmetric but incomplete lightcurve. Period spectrum analysis showed only one deep minimum in the RMS fit, at P = 8.244 ± 0.001 h. The amplitude of the lightcurve is A = 0.14 ± 0.02 mag.

1060 Magnolia was selected from the list in Warner *et al*. (2011a). The asteroid was reported to have a period 2.9017 h, amplitude 0.09-014 mag, and quality code U = 2 (see Behrend, 2009). It was been observed for seven nights covering a 12-day span. Three sessions were longer than 6 hours; these didn't show the 2.917-hour period as expected. The low amplitude of the lightcurve versus the noise in the data made finding a definitive period difficult. The analysis shows a small preference for P = 5.821 h with A = 0.08 ± 0.02 mag. Periods of 2.901 h and 5.821 h were plotted and analysed. The dispersion for P = 5.821 showed the smaller dispersion. When plotting single sessions longer than six hours versus both periods, we saw a better overlap with P = 5.821 h. This leads us to conclude that this is the correct period.

1474 Beira. This asteroid was selected from the list in Warner *et al.* (2011a), which indicated a period of 4.184 h, amplitude 0.18 mag, and quality code U = 3. It was been observed for seven nights over a 19-day span. The sky motion was so large that it was necessary to move the telescope during the night to keep the asteroid within the image. We used two sessions per night and aligned them by changing the zero point of the second session. After that, we used the two sessions as one when doing a period search. Some sessions were longer than 6 hours, all of them clearly showing an asymmetric curve with at least 3 minimums and 3 maximums. This removed all doubt about the period solution. Period spectrum analysis found P = 4.184 ± 0.001 h with A = 0.24 ± 0.02 mag, which confirmed the period reported in Warner *et al*. (2011a; see Koff, 2004). .

1604 Tombaugh. This minor planet is named after Clyde Tombaugh, the man who found Pluto. It was selected from the list in Warner *et al*. (2011b) where it was reported to have P = 7.047 h, A = 0.16-0.20, and quality code U = 2+. It was observed for three nights in 2012 October and, after a long spell of bad weather, again on three nights in December, or a total span of 53 days. The longest session was about 4 hours and showed a bimodal lightcurve. Period spectrum analysis found a best-fit period of 7.056 ± 0.001 h with amplitude A = 0.35 ± 0.02 mag.

Asteroid		Date	Phase Angle	Time h.	Num. Obs.
612	Veronika	2012-09-11	8.1	2.4	62
612	Veronika	2012-09-13	7.8	4.5	117
612	Veronika	2012-09-14	7.7	6.3	152
612	Veronika	2012-09-15	7.6	2.4	67
612	Veronika	2012-09-20	7.5	6.7	116
612	Veronika	2012-09-21	7.6	6.0	135
612	Veronika	2012-09-24	8.0	1.9	52
612	Veronika	2012-10-07	11.5	5.5	139
612	Veronika	2012-10-16	14.3	4.2	118
1060	Magnolia	2012-08-08	7.6	6.0	110
1060	Magnolia	2012-08-10	7.5	4.4	116
1060	Magnolia	2012-08-11	7.6	5.7	105
1060	Magnolia	2012-08-14	8.0	4.3	108
1060	Magnolia	2012-08-17	8.9	6.0	144
1060	Magnolia	2012-08-18	9.3	6.2	154
1060	Magnolia	2012-08-20	10.0	4.5	144
1474	Beira	2012-08-21	20.4	6.8	115
1474	Beira	2012-08-22	20.2	3.0	76
1474	Beira	2012-08-26	19.6	6.9	179
1474	Beira	2012-08-27	19.5	6.8	172
1474	Beira	2012-09-06	19.9	6.4	149
1474	Beira	2012-09-07	20.0	4.6	101
1474	Beira	2012-09-10	20.7	6.5	201
1604	Tombaugh	2012-10-20	6.8	4.0	101
1604	Tombaugh	2012-10-22	7.3	3.0	76
1604	Tombaugh	2012-10-23	7.6	2.0	55
1604	Tombaugh	2012-12-10	19.1	0.9	21
1604	Tombaugh	2012-12-11	19.1	2.5	47
1604	Tombaugh	2012-12-12	19.2	3.9	90

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