TABLE 1

BASIC DATA OF THE PROGRAM STAR

Star	Variability Type	Galactic longitude $l^{\rm II}(^\circ)$	Galactic latitude $b^{\rm II}(^\circ)$	Spectral Type	Period (days)
V Hya	SRa	269	+33.6	C7.5,E	531
CZ Hya	Mira	266	+29.9	Nev,C	442
R For	Mira	215	−68.1	C0,E	389
R Lep	Mira	214	−31.3	C7,6E	430
Y Cvn	SRb	126	+71.6	C7,I	157
T Dra	Mira	86	+29.9	N0,E	422
RV Aqr	Mira	49	−29.6	C0,E	454
RT Cap	SRb	22	−27.9	C6,II	393

departs from spherical symmetry (Trammell et al. 1994). Polarimetric monitoring of evolved stars will provide us with information about their evolution because the degree of polarization and the polarization position angle are related to changes in their morphology. Evolved stars are variables, but flux variations do not necessarily imply changes in the degree of polarization of its envelope. At low polarization values, the observations might be contaminated by interstellar polarization. The contribution of this effect is enhanced towards the galactic disc and decreases with galactic latitude.

There are strong reasons to believe that the main mechanism for polarization of stellar flux from these envelopes is light dispersion, either by dust grains ($\propto \lambda^{-1}$) or molecules ($\propto \lambda^{-4}$) formed in the cold envelope. Multi-wavelength polarimetry observations could provide us with better information to determine which of these mechanisms dominates according to its wavelength dependence. Also, a polarimetric study can give us information on the size and chemical composition of the dust grains, since polarization is a function of the refractive index.

In this paper we present *UBVR* polarimetry and photometry for a sample of eight high-galactic latitude evolved carbon stars over a period of one year. The wavelength and time dependence of their degree of polarization, the position angles, and brightnesses are presented. Four of the objects have no previously reported values for these parameters. All but one of the objects have no previously reported polarization measurements in the U band.

2. OBSERVATIONS

The basic data for the observed carbon stars are listed in Table 1. They were selected from the list of Hiriart & Kwan (2000) and Hiriart (1998) where model results for gas and dust emission from their circumstellar envelopes are available. All the selected objects have galactic latitude $|b^{\rm II}| \geq 20^\circ$ to minimize contamination by polarization from the galactic plane. The envelopes of these stars are optically thin so they can be observed at optical wavelengths. All the stars have been observed in the infrared and molecular gas emission, from which the mass loss rates have been determined (Oloffson et al. 1993).

Linear polarization measurements were made at the 0.84 m, f/15, telescope of the Observatorio Astronómico Nacional in the Sierra de San Pedro Mártir, Mexico, using a CCD camera and the POLIMA polarimeter (Hiriart et al. 2005). The CCD camera employed an e2V chip with 2048×2048 pixels and a 13 μm pixel size, which provides a plate scale of 0.44 arc-sec pixel^{-1}. POLIMA consists of a rotating Glan-Taylor prism driven by a step motor. Since the polarimeter is a single-beam device with a very slow modulation, photometric conditions are required for accurate polarimetry. The U, B, V, and R measurements were obtained between January and December 2009 at or near the new moon phase in all cases. Only data from photometric nights were considered.

Separate images were obtained for all four wavelengths and at relative position angles of the prism of 0°, 45°, 90°, and 135°. The zero position angle was established from observations of polarized standards and it was found to be $(-91 \pm 2)^\circ$. The instrumental polarization was determined by observing unpolarized standard stars and it was found to be $(0.6 \pm 0.5)\%$. The error quoted for the instrumental polarization is relatively high because single-beam polarization measurements are affected by sky variations during data acquisition at the four position angles of the prism. We used polarized and unpolar-