

# Hertzsprung-Russell diagram and mass distribution of barium stars (Corrigendum)

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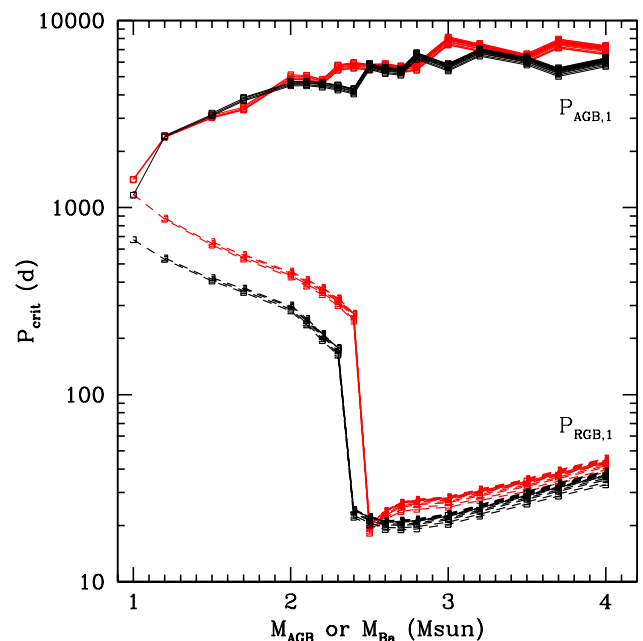
**Key words.** binaries: general – stars: late-type – stars: chemically peculiar – errata, addenda

We noticed that the values of  $P_{\text{RGB},1}$  and to a lower extent  $P_{\text{AGB},1}$  shown in Fig. 17 of our article Escorza et al. (2017) had been wrongly estimated because the algorithm to find the maximum stellar radius contained an error. In the original plot, we did not discard the core-He burning phase and for stars with  $M \gtrsim 2.2 M_{\odot}$ , the radius during core-He burning can exceed the value at the RGB tip. A correct version of Fig. 17 is published on this page.

The main difference between the two figures concerns the critical periods at which the primary star fills its Roche lobe at the tip of the RGB. Intermediate-mass stars ( $2.4 \lesssim M/M_{\odot} \lesssim 8$ ) do not expand a lot during their RGB evolution. They are thus less likely to fill their Roche lobe (their critical period remains short) and do not disappear from the barium star population. The bump between 2 and 3  $M_{\odot}$  shown in the old version of the figure is removed with the new data, comforting this conclusion. Systems with a low-mass ( $M < 2.4 M_{\odot}$ ) primary and periods shorter than 110 d suffer from Roche-lobe overflow (RLOF) at the RGB tip. For these stars, the critical period increases with decreasing mass up to about 1000 d for 1  $M_{\odot}$  stars.

## References

Escorza, A., Boffin, H. M. J., Jorissen, A., et al. 2017, [A&A, 608, A100](https://doi.org/10.1051/0004-6361/201731832)



**Fig. 17.** Critical periods below which one of the components fills its Roche lobe at either the tip of the RGB ( $P_{\text{RGB},1}$ , dashed line at the bottom of the figure) or at the tip of the AGB ( $P_{\text{AGB},1}$ , solid line at the top of the figure). The values  $R_{\text{RGB},\text{tip}}$  and  $R_{\text{AGB},\text{tip}}$  are computed from the STAREVOL outputs. Red curves have solar metallicity  $Z = 0.0134$  and black curves have  $[\text{Fe}/\text{H}] = -0.5$  or  $Z = 0.0043$ . Various superimposed lines in a series correspond to various barium-star masses,  $M_{\text{Ba}}$ , which may be identified from the starting point of the curve. The critical period  $P_{\text{RGB},2}$  can be read off the  $P_{\text{RGB},1}$  curve at the corresponding  $M_{\text{Ba}}$  value, which determines the key value  $R_{\text{RGB},\text{tip}}$ . Although  $P_{\text{RGB},1}$  and  $P_{\text{RGB},2}$  are not strictly equal, they are not different enough to warrant a specific  $P_{\text{RGB},2}$  curve that would jeopardize the clarity of the figure.