HELIUM, [Fe/H] ABUNDANCES AND THE HR (LOG T_{EFF}, M_{BOL}) DIAGRAM WITH HIPPARCOS DATA OF THE FOUR NEAREST OPEN CLUSTERS: HYADES, COMA BERENICES, THE PLEIADES AND PRAESEPE

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After having studied in great detail the observational HR diagram (log T_{eff}, M_{bol}) composed by 40 main sequence stars of the Hyades (Perryman et al.,1997, A&A., in press), we have tried to apply the same method to the observational main sequences of the three next nearest open clusters: Coma Berenices, the Pleiades, and Praesepe. This method consists in comparing the observational main sequence of the clusters with a grid of theoretical ZAMSs. The stars composing the observational main sequences had to have reliable absolute bolometric magnitudes, coming all from individual Hipparcos parallaxes, precise bolometric corrections, effective temperatures and metal abundances from high resolution detailed spectroscopic analyses. If we assume, following the work by Fernandez et al. (1996, A&A,311,127), that the mixing-lenth parameter is solar, the position of a theoretical ZAMS, in the (log T_{eff}, M_{bol}) plane, computed with given input physics, only depends on two free parameters: the He content Y by mass, and the metallicity Z by mass. If effective temperature and metallicity of the constituting stars of the 4 clusters are previously known by means of detailed analyses, one can deduce their helium abundances by means of an appropriate grid of theoretical ZAMS's. The comparison between the empirical (log T_{eff}, M_{bol}) main sequence of the Hyades and the computed ZAMS corresponding to the observed metallicity Z of the Hyades (Z= 0.0240 $\pm$ 0.0085) gives a He abundance for the Hyades, Y= O.26 $\pm$ 0.02. Our interpretation, concerning the observational position of the main sequence of the three nearest clusters after the Hyades, is still under way and appears to be greatly more difficult than for the Hyades. For the moment we can say that:

- The 15 dwarfs analysed in detailed in Coma have a solar metallicity: [Fe/H] = -0.05 $\pm$ 0.06. However,their observational main sequence fit better with the Hyades ZAMS.
- The mean metallicity of 13 Pleiades dwarfs analysed in detail is solar. A metal deficient and He normal ZAMS would fit better. But, a warning for absorption in the Pleiades has to be recalled.
- The upper main sequence of Praesepe, (the more distant cluster: 180 pc) composed by 11 stars, analysed in detail, is the one which has the best fit with the Hyades ZAMS. The deduced 'turn-off age' of the cluster is slightly higher than that of the Hyades: 0.8 Gyr instead of 0.63 Gyr.

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