Merger history.- Disk (blue, late-type) galaxies are dynamically fragile systems and thus they are not expected to survive strong perturbations such as those produced in major mergers or close interactions. However, as several theoretical studies have shown (e.g., Robertson et al. 2004; Governato, Mayer, & Brook 2008), when the mergers are gas-rich ('wet') and/or occur at early epochs (in fact, both facts are expected to be correlated), it is highly probable that a gaseous disk is regenerated or formed again with the late accreted gas. Therefore, a reasonable restriction for halos that will host disk galaxies is that they did not undergo *central* major mergers since a given epoch (at earlier epochs, while the central major merger may destroy the disk, a new gaseous disk can be formed later on). Based on numerical simulations, Governato et al. (2008) suggested that a 'wet' major merger of disk galaxies at $z \sim 0.8$ has still a non-negligible probability of rebuilding a significant disk by $z \sim 0$. We will assume here that halos whose *centers* have a major merger at $z < 0.8$ will not host a disk galaxy.

In Colín et al. (2011, in preparation) the present-day abundance fraction of halos with no *central* major merger since $z = 0.8$ was measured as a function of $M_{\rm h}$ from an N-body ΛCDM cosmological high-resolution simulation with $\Omega_m = 0.24$, $\Omega_\Lambda = 0.76$, and $\sigma_8 = 0.75$ (box size and mass per particle of 64 h^{-1} Mpc and $1.64 \times 10^7 h^{-1}$ $M_\odot$, respectively). The friends-of-friends (FOF) method with a linking-length parameter of 0.17 was applied for identifying halos. The mass ratio to define a major merger was $q = M_{\rm h,2}/M_{\rm h,1} > 0.2$ and the merger epoch was estimated as the time when the center of the accreted halo arrived at the center of the larger halo by dynamical friction; this epoch is calculated as the cosmic time when both FOF halos have "touched" plus the respective dynamical friction (merging) time as given by the approximation of Boylan-Kolchin, Ma, & Quataert (2008). The fraction of halos that did not suffer a major merger since $z = 0.8$ with respect to all the halos as a function of $M_{\rm h}$ measured in Colín et al. (2011, in preparation) is used here to correct our distinct S-T *HMF*. This measured fraction is shown in the inset in the lower panel of Figure 3; the solid line is a linear fit by eye in the log-log plot: $\log(n_{\rm noMM}/n_{\rm all}) = 0.472 - 0.065\log(M_{\rm h}/M_\odot)$. As it is seen, the fraction slightly decreases with mass, which is consistent with the idea that larger mass halos are assembling later with a significant fraction of their masses being acquired in late major mergers. After the correction mentioned above, we get the mass function of halos that did not suffer a central major merger ($q > 0.2$) since $z = 0.8$ (short-dashed black line in the lower panel of Figure 3).

The final corrected HMFs.- The function obtained after (i) subtracting from the distinct S-T *HMF* the group mass function and (ii) excluding halos that did not suffer a late central major merger is plotted in Figure 3 (blue long-dashed line). This mass function is proposed here to correspond to halos that today host blue galaxies. The overall number fraction of these halos with respect to the distinct ones (described by the S-T *HMF*) is ∼58%, which is roughly consistent with the fraction of blue galaxies in the YMB09 sample. The *HMF* corresponding to the complement is plotted in Figure 3 as the red dot-dashed curve. By exclusion, this *HMF* will be associated with the *GSMF* of the red central galaxy sub-sample for deriving the $M_{\rm s}$–$M_{\rm h}$ relation of red galaxies.

3. RESULTS

3.1. *The overall, central, and satellite stellar-halo mass relations*

In Figure 4, the $M_{\rm s}$–$M_{\rm h}$ relation obtained by using the Li & White (2009) *GSMF* (see § 2.1 and Figure 1) and the S-T *HMF* corrected to include sub-halos is plotted (long-dashed blue line). The relation given by BCW10, who also used as input the Li & White (2009) *GSMF*, is shown (short-dashed red line). Both curves are almost indistinguishable, showing an excellent consistency of our results with those of BCW10, in spite of the differences in some of the methodological aspects.

Further, we plot in Figure 4 the $M_{\rm s}$–$M_{\rm h}$ relation as above but using now the total YMB09 *GSMF* (dot-dashed pink line). This relation is similar to the one inferred using the Li & White (2009) *GSMF*. For $\log(M_{\rm h}/M_\odot) \gtrsim 12$, the former slightly shifts with mass to higher values of $M_{\rm s}$ for a given $M_{\rm h}$ than the latter (at $\log(M_{\rm h}/M_\odot) = 13.5$ the difference is no larger than 0.08 dex in $\log M_{\rm s}$). Such a shift is explained by the (small) systematical difference between the YMB09 and Li & White (2009). *GSMF*s at masses larger than $\log(M_{\rm s}/M_\odot) \sim 11$ (see § 2.1 and Figure 1).

In Figure 4, the $M_{\rm s}$–$M_{\rm h}$ relations given in Baldry et al. (2008, dot-dashed orange line), Moster et al. (2010, short-long-dashed line) and Guo et al. (2010, dotted green line) are also plotted. When necessary, we have corrected the stellar masses to the Chabrier IMF, and the halo masses to the definition of virial mass used here (see § 2.2). As mentioned above, Baldry et al. (2008) corrected their *HMF* to exclude groups/clusters of galaxies (something that we do