RevMexAA (Serie de Conferencias), **24**, 237–238 (2005)

GOYA SURVEY: U AND B NUMBER COUNTS IN THE GROTH-WESTPHAL STRIP

C. Eliche-Moral,[1] M. Balcells,[1] M. Prieto,[1,2] and D. Cristóbal-Hornillos[1]

We present U and B galaxy number counts from a field that comprises a 0.29 square degrees area of sky, and which covers the Groth-Westphal Strip (Groth et al.,1994). Reached 50% limiting magnitudes are 24.8 magnitudes in U and 25.5 in B in the Vega system, which makes our U number counts to have the biggest area×depth product at the moment. These data are part of the GOYA Survey (*Galaxy Origins and Young Assembly*), a deep multiband survey whose principal aim is creating a database to provide the NIR multi-objet spectrograph EMIR at GTC with identified samples of galaxies at cosmological distances up to z=3. Preliminary results based on fits of evolutionary codes of galaxy populations to the observed number counts, simultaneously to U, B and K_S filters, show that an standard Λ-dominated cosmological model reproduces the optical and IR counts better than the Einstein-de Sitter one.

Number Counts

Observations were carried out using the Wide Field Camera (WFC) at Isaac Newton Telescope (INT) in La Palma, a mosaic of 4 CCDs which gives an irregular field of view of ∼ 34” × 34”. Data were reduced, astrometrically-calibrated and stacked using a package developed by us, based on MSCRED in IRAF. Source detection and photometry was carried out with the `SExtractor` package (Bertin & Arnouts 1996). In order to get final number counts, raw counts derived from U and B catalogs were corrected from efficiency, spurious detections and star counts. Final galaxy number counts in U and B in the Vega system are plotted on Fig.,1 and 2. Deep U number counts from other authors are made over small sky areas in comparison to ours. So, our results are more representative in statistical terms in the range 20≤ U ≤24.5 magnitudes. A least-squares fit between 19.5 and 25.5 gives a slope $d(logN)/dm$ ≈0.50 in U and ≈0.47 in B.

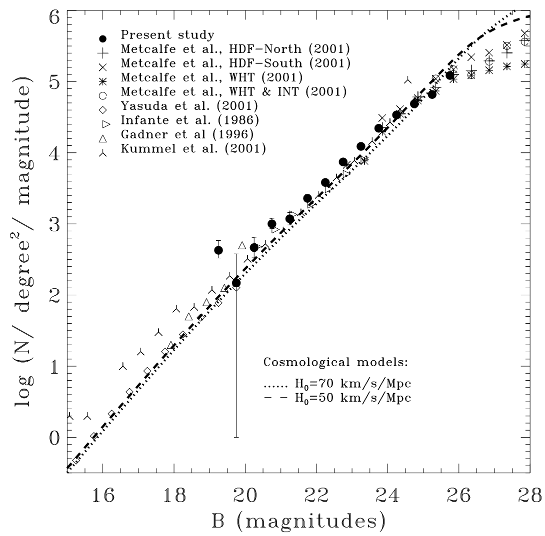

Fig. 1. Final B number counts, corrected from efficiency, spurious sources and star counts. Other authors' results are plotted for comparison (see symbol explanations). Dashed and pointed lines are the cosmological number counts models explained at the text.

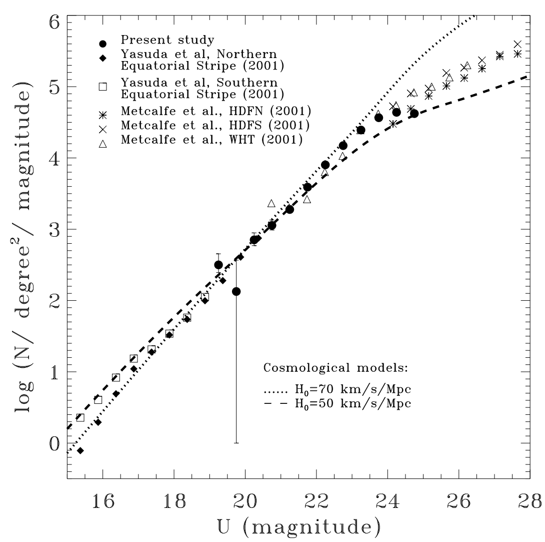

Fig. 2. Final U number counts. See caption of Figure 1.

[1] Instituto de Astrofísica de Canarias, E-38200, La Laguna, Tenerife, Spain (mcem, ballcels, mpm, dch@ll.iac.es).
[2] Departamento de Astrofísica, Universidad de la Laguna, E-38206, La Laguna, Tenerife, Spain.

TABLE 1

PRINCIPAL CHARACTERISTICS OF THE GALAXY MIXTURE USED IN THE MODELS

Galaxy Type	SFR[a] Law	τ	$Z/Z_{\odot}$	z_{form} Λ-dominated	z_{form} Einstein-de Sitter	% Distribution[b]
E/S0	exp	1	2.5	4	7	28
Sab/Sbc	exp	4	1.0	4	7	47
Scd	const	-	0.2	4	7	13
Irr	const	-	0.2	-	-	12

[a]Metalicities and star formation rates are those from Gardner (1998).

[b]The local galaxy mixture has been taken from Ellis & Allen (1983).

Cosmological Models

In order to predict number counts in both filters, we have used the `ncmod` code by Gardner (1998), which draws galaxy population evolution backwards in time using the population synthesis models of Bruzual & Charlot (1993), and considering a luminosity function at z=0, a mixture of morphological types, a star formation rate and a formation redshift for each type. In Fig. 1 and 2, we have plotted number counts prediced by an standard Λ-dominated cosmological model (H_0 = 70 km s^{-1}Mpc^{-1}, Ω_M=0.3, Ω_Λ=0.7) and an Einstein-de Sitter one in our filters. We have considered Salpeter's Initial Mass Function and the Schechter's parametrization of the Luminosity Function by Pozzetti et al.,(1996). Principal galaxy characteristics used in the model appear in Table 1. The observed number counts show that a Λ-dominated model reproduces the optical and IR counts obtained in the Groth Strip by our group (Cristóbal-Hornillos et al. 2003) better than the Einstein-de Sitter one. The Luminosity Function is critical in these models, but is poorly determined. So, one our next aims is to determine this function in the UBVIK$_S$ bands of the GOYA Survey.

REFERENCES

Groth, E. J., et al. 1994, BAAS, 185, 5309
Bertin, E., & Arnouts, S. 1996, A&ASS, 117, 393
Gardner, J. P. 1998, PASP, 110, 291
Bruzual, G. A., & Charlot, S. 1993, ApJ, 405, 583
Pozzetti, L., et al. 1996, MNRAS, 281, 953
Cristóbal-Hornillos, D., et al. 2003, ApJ, 595, 71
Ellis, R. S., & Allen, D. A. 1983, MNRAS, 203, 685