Hα EMISSION-LINE STARS IN M33

C. NEESE, T. E. ARMANDROFF and P. MASSEY
National Optical Astronomy Observatories
Kitt Peak National Observatory
P.O. Box 26732, Tucson, AZ 85726-6732, U.S.A.

We have used the KPNO Schmidt+CCD with interference filters to survey the nearby Sc galaxy M33 for sources of Hα emission. The Schmidt+CCD combination provided large area combined with high quantum efficiency and linear response; we were able to survey most of M33 to a hitherto unprecedented depth in Hα. The Hα emitting sources revealed by this survey include about 500 stellar sources with red continuum magnitudes ranging from 17th to 21st. Such Hα emission-line stars in our own galaxy and in the Magellanic Clouds include many extremely interesting objects of high luminosity and high mass-loss rates, such as Of and Oe stars, extreme Be stars, Wolf-Rayet stars, Hubble-Sandage variables, and SS433. In fact, four known Hubble-Sandage variables which are within the area of the survey were easily detected.

Using the KPNO 4-meter telescope with the long-slit cryogenic camera and with the Nessie multi-object fiber-feed, we have obtained low-resolution spectra for over 200 of the stellar Hα emitting sources detected in this survey. Unsurprisingly, about half of these objects turned out to be compact HII regions with no detectable continuum. Twenty percent of the objects observed are red stars. While some contamination of our sample by red stars is expected given the placement of our off-band filter, it is interesting that half of the red stars detected also show Hα emission. These may be Mira variables.

No analog of SS433 was found, although spectra were obtained for all of the strongest Hα sources. We believe that if any SS433-like objects exist in M33, none are oriented in such a way as to be detectable. One bizarre object was found which exhibits extremely broad Hα emission ($\approx$ 50 Å FWHM) but no emission at Hβ, HeII λ4686, or CIV λ5812. Higher dispersion spectroscopy for this extremely interesting object is planned. Nine stars appeared to be extreme Be or Oe stars. Three new Wolf-Rayet stars were found, although their detection was due to associated nebulosity, not the HeII Pickering line coincident with Hα. One known supernova remnant was observed, and its spectrum displays evidence of shock heating. We 'rediscovered' four of the five known Hubble-Sandage variables, plus we found an additional five objects which are spectroscopically indistinguishable from the known Hubble-Sandage variables with their forest of FeII and [FeII] emission. These objects are currently being investigated for photometric variability.

K. A. van der Hucht and B. Hidayat (eds.),
Wolf-Rayet Stars and Interrelations with Other Massive Stars in Galaxies, 651.