DARWIN INITIATIVE FOR THE SURVIVAL OF THE SPECIES
(First Annual Report 1994/95)

1.1 Name of Institution and Address for Correspondence
NATURAL RESOURCES INSTITUTE
CENTRAL AVENUE, CHATHAM MARITIME, CHATHAM, KENT ME4 4TB

1.2 Project Leader
DR. J. MARK RITCHIE

1.3 Title
INVERTEBRATE BIODIVERSITY OF THE MKOMAZI GAME RESERVE, TANZANIA.

2. PROJECT DETAILS

2.1 Objectives

1. To conduct a baseline inventory of selected terrestrial invertebrate groups for the MGR by making representative taxonomic collections and identifying these where possible to genus and/or species.

2. To provide quantitative measures of the species numbers and diversity of key invertebrate groups for the major habitat types within the MGR, including calculation of appropriate indices of diversity.

3. To measure the degree of change in species diversity (β) and faunal similarity between major habitat types within the MGR.

4. To determine the effects of burning and grazing on species richness and diversity in different habitat types.

5. To develop secure, well-documented savanna invertebrate biodiversity collections at the TPRI, Arusha, Tanzania.

6. To provide training for Tanzanian personnel in:
   - collection and preparation of biological material for diversity studies,

- maintenance of biodiversity reference collections,
- taxonomy of appropriate invertebrate groups, and
- measurement and interpretation of ecological parameters including diversity indices.

2.2 Timetable

As indicated in the original timetable, the field phase of the project will be completed between April 1994 and March 1996. This has involved all the UK members of the project visiting Tanzania for periods of between three and five weeks during 1994/95, as scheduled. A total of six field visits is planned for 1995/96 with a regular monthly sampling programme carried out by Tanzanians to provide seasonal continuity.

Processing of samples, analysis of data and writing of scientific papers will continue through 1996 until March 1997, culminating in a series of presentations to the Programme Review Conference in April 1997. Training activities consisting of a mixture of field and laboratory work in Tanzania and short visits by Tanzanians to UK to develop specific knowledge and skills, will run in parallel with the field and laboratory phases from April 1994-July 1996. Published outputs will be completed by the end of March 1997.

No significant change to this timetable has occurred nor is any envisaged at the time of writing (May 1995) except for the revision of the UK-based training programme to defer the second Darwin scholar from 1995 to 1996 and the retimetabling of the Darwin Fellowship to begin towards the end of 1995/96 rather than in mid-1995. This change was occasioned by the Department of the Environment's requirement that the budget for 1995/96 should be reduced by £15,000 and that for 1996/97 increased by a similar amount (see Statement on Future Work, already submitted).

2.3 Profile of project team and percentage of time used

Dr J Mark Ritchie (Project Coordinator) Natural Resources Institute, UK (10%) Coordination of visits to Tanzania, research reports, training programmes and liaison with RGS and Darwin Initiative. Research on biodiversity of grasshopper fauna (Acridoidea) of Mkomazi.

Dr Anthony Russell-Smith, Natural Resources Institute, UK (10%). Research on biodiversity of ground living and arboreal spiders (Araneae) in Mkomazi (utilizing data from hand collecting, sweeping and sampling using pitfall traps and canopy spraying).

Dr George C. McGavin, Hope Entomological Collections, Oxford University Museum, UK (20%). Research on guild biodiversity of insects and other invertebrates of tree canopies (especially *Acacia* species) in Mkomazi, with special reference to plant sucking and predatory bugs (Hemipter: Heteroptera)

Mr Jonathan Davies, Dept of Entomology, The Natural History Museum, London, UK (40%). Research on the beetle fauna of Mkomazi in relation to habitat types and human interference (using pitfal trapping, sweeping, malaise traps, canopy spraying).

Mr Paul Marenga, Dept of Wildlife, Ministry of Tourism and Wildlife, Tanzania (20%). Field Management of the Mkomazi Programme and overall responsibility for monthly pitfall sampling programme at Ibaya to provide information on seasonal variation in invertebrate diversity.

Mr Bruno Nyundo, University of Dar es Salaam, Tanzania (20%). Research on biodiversity of pollinator insects associated with particular tree species in Mkomazi.

Mr Elias Kihumo, Tropical Pesticides Research Institute, Arusha, Tanzania (10%). Field assistant and trainee biodiversity collection curator at TPRI.

Mr Ramadhani Makusi, formerly of TPRI, Arusha, Tanzania (20%). Senior field assistant, assisting Mr Marenga in carrying out the monthly pitfall trap sampling programme.

3. ACHIEVEMENTS AND OUTPUTS RELATIVE TO OBJECTIVES

- Four Tanzanians (two professional and two technical) are now directly involved in project work (see personnel above) and have been provided with initial training in biodiversity sampling and sorting techniques (not counting Tanzanian botanist (Raphael Abdullah) and Wildlife Department game rangers) *(Objective 6)*.

- At least 200 morphospecies of spiders belonging to 36 families have been recognized in samples collected up to the end of 1994 in Mkomazi *(Objective 1)*. The spider fauna of Mkomazi may eventually prove to be two to three times bigger than this, given the small proportion of available habitat and seasonal distribution sampled to date. Several species new to science are already known to be represented among the material collected.

- Analysis of spiders from pitfall trapping in dry and rainy seasons shows considerable differences between habitats and seasons. Initial results suggest that species richness in rainy season samples was reduced by burning in bushland (especially for Gnaphosidae) but further sampling is needed to determine seasonal variation and clarify the effects of burning *(Objectives 2, 3, 4)*.

- A short paper (by J.M. Ritchie and R. Makusi) is in press with the *FAO Plant Protection Bulletin* (1994) on the association of the maize cob borer moth *Mussidia nigrivenella* and the tree *Afzelia cuanzensis* in Mkomazi *(Objective 1)*.

- Based on hand net sampling, the grasshopper fauna of Mkomazi is comparable in richness with that of the Serengeti. Three species new to science have been described (Jago, 1994; Grunshaw, in press; Jago, in press) and a checklist is in preparation *(Objectives 1, 2)*.

- In excess of 3000 specimens of beetles were collected in pitfall trap sampling up to end of March 1994. These are being sorted to species and the relationship between habitat types and faunal diversity within and between families and the seasonal occurrence of particular species are being analyzed *(Objectives 1, 2, 3, 4)*.

- Preliminary analysis of results of sampling of trees (for guilds of canopy-living species) using non-persistent insecticidal spraying, based on samples from 34 trees of 13 species indicates that species diversity and abundance in non ant-attended trees is much greater than previously recorded in a study carried out between 1982 -1985 in the Kora National Reserve, Kenya *(Objectives 2, 3)*.

- The insect museum facilities at TPRI have been upgraded by provision of two new 20-drawer insect cabinets to replace inadequate boxes and open-topped drawers in use at present. Identified project specimens will now be returned to TPRI to form a valuable biodiversity reference collection for Tanzania *(Objective 5)*.

4. MONITORING AND EVALUATION

- Back-to-office reports have been submitted by each member of the team after each field trip. These have been sent to Mr Nigel Winser, Deputy Director, Royal Geographical Society. Copies of these reports for 1994/95 are attached with this report.

- A verbal report was made by the Project Coordinator to the Mkomazi Ecological Research Programme Committee, under the Chairmanship of Lord Chorley, at the Royal Geographical Society on 9 February 1995.

- A short report of progress during the first year of the project was submitted to the RGS in March 1995. The progress of the Mkomazi Programme is overseen by the RGS Research and Expeditions Committee.

- The Darwin Initiative's Statement of Future Work was completed and returned in March 1995.

- An overall report on the work of the Mkomazi Research Programme for 1994/95 is in preparation by the Royal Geographical Society for submission to the Tanzanian Government and other interested parties, including the Darwin Initiative.

- Workshops are being held in Tanzania to inform local people of the work of the Programme and to solicit their views. The first of these took place in Dar-es-Salaam in July 1994. The second is scheduled for July 1995.

5. PUBLICITY

Publicity for the project has been largely through the medium of the Royal Geographical Society's presentation of the overall Mkomazi Ecological Programme via:

- Letterhead for the Programme with approved Darwin Initiative Logo and the words "A Darwin Initiative funded project" alongside those of the major participating organizations (Dept of Wildlife Tanzania, RGS, University of Oxford).

- Publication of *"Habari za Mkomazi - Newsletter of the Mkomazi Research Programme"*. carrying the Darwin logo and an acknowledgement that the invertebrate biodiversity research is funded by the Darwin Initiative. This newsletter is widely distributed to sponsors and other interested parties in UK and Tanzania. A copy of issue number two is attached with this report.

- A series of workshops which are being held in Tanzania. The first of these took place on 28 July 1994 in Dar-es-Salaam. These meetings pay tribute to the support of the Darwin Initiative.

6. EXPENDITURE

ANNEXES

1. Habari za Mkomazi - Newsletter of the Mkomazi Research Programme, No 2. 4 pp.

2. Report on a visit to Tanzania to undertake a survey of the insect faunas of tree canopies in the Mkomazi Game Reserve, 21 July - 18 August, 1994. G. McGavin. 8 pp.

3. Visit to Tanzania, 11-29 November, 1994. A survey of the beetle faunas of different habitat types in Mkomazi game Reserve, Tanzania: the effect of habitat change and seasonality on community structure, diversity and abundance. J Davies. 4 pp.

4. Report on a visit to Tanzania to continue a survey of arthropod biodiversity in the Mkomazi Game Reserve, 12-29 Nov 1994. J.M. Ritchie. 4 pp.

5. Visit to Mkomazi Game Reserve, Tanzania. 11-29 November 1994. A Russell-Smith. 3 pp.