Biomathematics and Statistics Scotland

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Biomathematics and Statistics Scotland (BioSS) is devoted to the application of statistics and mathematics in the biological sciences. Its principal remit is to support the SOAEFD programme of biological research, which is mostly carried out within the SABRIs and SAC. This is achieved through a dispersed group of statisticians, mathematicians and computing experts based at BioSS centres in Edinburgh, Dundee, Aberdeen and Ayr. 1998 saw a continuation of our high output of publications and training courses. Success with competitive bids for new research funding allowed us to expand our research activity in two key areas: statistical genetics and bioinformatics; and veterinary epidemiology and food safety. Links were strengthened further with Scottish universities through new research grants and postgraduate students. The achievements of the BioSS unit at SCRI are highlighted below.

Work in statistical genetics received a major boost through BioSS staff winning two BBSRC grants in collaboration with SCRI scientists. One project funded under the initiative 'Genetics of Agriculturally Important Traits', is developing methods for linkage and QTL mapping in tetraploids using codominant markers. This will be used to enhance potato breeding techniques at SCRI. Work was completed on the development of statistical methods to detect mosaic sequences within multiple sequence alignments, which formed the basis of a SOAEFD studentship. BBSRC-funding, obtained in association with BITR and Department of Applied Computing, University of Dundee, will allow aspects of this work using hidden Markov models to be further developed and made more widely available. Our growing international reputation in statistical and computational genetics was acknowledged by invitations to present linkage analysis and QTL mapping workshops in Australia, and an EMBnet bioinformatics training course in Beijing.

Theoretical work on the use of additive models to analyse designed experiments in the presence of trends and local neighbour effects was completed and implemented in a set of Splus programs. Work on spatio-temporal models appropriate to semi-natural vegetation data is continuing in association with St Andrew's University and Institute of Terrestrial Ecology. The models have been applied successfully to Scottish vegetation land classification data.

Two projects have been undertaken with SCRI aimed at making current potato research more readily available to end users through decision-support systems. One project provides prediction of potato yields in the presence of cyst nematodes. The other involves a crop management tuber package for potatoes built around existing models of yield prediction and size distribution.