

A COMPUTER-BASED SYSTEM FOR PREDICTING THE POTENTIAL DISTRIBUTION AND RELATIVE ABUNDANCE OF SPECIES IN RELATION TO CLIMATE

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CLIMEX is a dynamic simulation model which enables the estimation of an animal or plant's geographic distribution and relative abundance as determined by climate. CLIMEX is applied to different species by selecting the values of a series of parameters which describe the species' response to temperature and moisture. A population "Growth Index" (GI) describes the potential for growth of a population during the favourable season and four Stress Indices (Cold, Hot, Wet and Dry) describe the probability of the population surviving through the unfavourable season. The GI and Stress Indices are combined into an "Ecoclimatic Index" (EI), to give an overall measure of favourableness of the location or year for permanent occupation by the target species. The results are presented as tables, graphs or maps.

A species' climatic requirements are inferred from its known geographical distribution, relative abundance and seasonal phenology. Some life cycle data, such as developmental threshold temperatures, can be used to fine tune or interpret the CLIMEX parameter values. Once parameter values have been estimated, CLIMEX can be used to make predictions for independent locations.

DEVELOPMENT OF A COMPUTER AIDED CHEMICAL WEED CONTROL EXPERT SYSTEM

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A computer aided expert system is described which helps weed scientists and farmers in making ecologically and economically correct chemical weed control decisions.

The program enables the input and modification of data; enquiries by common and scientific names of weed/s and crop/s and by herbicide/s; the making of herbicidal control decisions with and without identification by morphological characters; development of experimental design and analysis; and the establishment of mathematical models by means of curve simulations.

Program testing has given satisfactory results.