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An Expert System for Mountain Pine Beetle
under Endemic Conditions in western
Lodgepole Pine Forests

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Expert Systems (ES) are being used more in the field of natural resources as a way to organize existing knowledge for use by land managers or research scientists. This poster details the development and use of an ES. Our ES deals with endemic (initial stages prior to outbreak) levels of mountain pine beetle (MPB), Dendroctonus ponderosae Hopkins (Coleoptera: Scolytidae), in the lodgepole pine, Pinus contorta Douglas var. latifolia Engelmann, type of the Intermountain West. For the initial ES, expert information about MPB was supplied by scientist on the MPB project with the Intermountain Research Station, Forest Service. Expertise from other scientist and pest management specialists will be incorporated into the knowledge base for development of future ES. Our initial objective in developing an ES was to organize existing knowledge and to identify areas of needed research. Our long-range goal is a detailed ES that can be used by land managers in their decision-making process.

First, a knowledge acquisition program (KAP)¹ was written to aid in obtaining knowledge from the experts on the functioning of the system. This information was then fed into KnowledgePro² (an expert system generator) which produced the expert system. Users provide parameters (e.g. dbh of the stand and infested trees, stand elevation, and various temperature values) pertinent to the stand in question. The ES uses this information to determine if the MPB population will increase, decrease, or remain static for the next year. The ES that we developed mimics the current knowledge closely and gives useful results according to the testers of the system. In its present form, the ES is a useful tool for research scientist and we anticipate other versions will be developed to aid land managers.

¹KAP designed and programmed by Kent Downing, 1/90.

²KnowledgeMaker. 1987. KnowledgeGarden. Nassau, NY.