

RESEARCH METHODOLOGIES AND STATISTICAL APPROACHES FOR MULTITACTIC SYSTEMS. Ed Luschei, Assistant Professor, University of Wisconsin, Madison, WI 53706.

Both logic and intuition suggest that multitactic weed control strategies may, on average, produce more favorable weed management outcomes than single tactic approaches. Despite a compelling logical basis, understanding the how agricultural systems respond to multitactic approaches presents researchers with difficulties sufficient to motivate careful consideration of research methodologies. We suggest there are two general classes of objectives: forecasting or decision-making and theory building. The later class can be decomposed into three types: case or proof-of-concept studies, exploration of generality and a search for alternative hypotheses. When the primary research objective is forecasting, one productive experimental approach combines widely dispersed sampling, an explicit representation of uncertainty and consideration of scenarios. Traditional agronomic designs are most suited to proof-of-concept studies, whereas mixed-model approaches are better for exploring generality, and model selection techniques for comparing alternatives. We demonstrate the use of several of these methods using examples from experiments across the state of Wisconsin.