

Recipe for MAS demonstration

“CSI Plant Style” was originally developed as a workshop for FFA students and advisors that was presented during the annual FFA State Convention held at Washington State University in Pullman, WA in May 2007. Since then, the workshop content was modified and presented at the annual Western Wheat Workers meeting (wheat breeders/extension specialists) and the WSU’s Spillman Agronomy Farm Field Day (farmers/seed specialists). The intention of the workshop was to demonstrate the process of integrating DNA technologies into wheat variety improvement efforts through hands-on learning. Participants identified traditional problems in wheat production, such as stripe rust susceptibility for example, and experienced the step-by step process that researchers go through to solve these problems. Participants cross-hybridized susceptible and resistant plants, extracted DNA from wheat tissue, learned the concepts behind PCR and used markers to identify plants carrying the targeted resistance gene based on DNA profiles. The efficiency of using DNA markers to identify traits of interest was contrasted to traditional selection procedures. Definitions and descriptions of genes, markers, linkage, and MAS were included to assist participants with understanding terms routinely used by the breeders. Participants enjoyed the opportunity to meet with researchers in a non-intimidating setting where they could learn, experiment with, and ask questions about these technologies. After presenting the material, participants were asked to describe what they liked about the experience and areas that need to be improved in the workshop (see comments below). The workshop presentation team also debriefed the experiences to identify ways in which we felt the workshop could be improved. We support and encourage other CAP participants to use our model and experience to develop similar workshops for their region. By capitalizing on the wisdom we have gained through our experiences, other presenters may avoid some of the problems we encountered in our workshops.

What worked:

We engage participants in as many hands-on opportunities as possible, which was well received. This allowed participants to experience what we actually do in the lab and exposed them to the challenges, degree of difficulty, and skill sets required to execute procedures. We emphasized that much of the work is not difficult but requires focus and precision. Our intention was to generate interest in and appreciation for the application of biotechnology to crop improvement efforts. The hands-on approach also kept participants highly engaged and responsive. Hands-on events included emasculation, cross hybridization, DNA extraction and precipitation, gel electrophoresis loading using the Licor system, and analysis of a Licor generated gel image. A picture visual of each procedure was projected for participants to use as a reference, and support personnel walked around the room offering assistance. We also used the PCR animation that is on the educational website to demonstrate the concept, which was more effective than our attempts to explain it ourselves.

Keep the presentation fun and interactive by asking for questions, answering questions, and using examples that are highly relevant to the audience. For example, we asked a group

of farmers to identify traits that they would target to develop a wheat variety best suited for their farms. We intentionally engaged different people from different areas of the room to keep the dialog flowing. We intentionally presented material in a way that was easy for non-science based participants to understand. Light-hearted jokes also were used to break the tension between participants and presenters.

What did not work:

In the first workshop, we only had on support assistant per 8-10 participants, which was inadequate. Due to the large number of hands-on activities, particularly for crossing activities, more assistants were needed. We recommend 1 experienced assistant per 4-5 participants. When participants were grouped together at a table, facilitating hands-on activities was much easier.

Clearly explaining the genetic components to non-scientists was difficult. Most participants asked follow up questions about genes, alleles and markers to clarify their understanding. Participants specifically requested that we avoid using acronyms to identify tools or procedures. Several participants requested that handouts containing important definitions be distributed prior to the workshop so that they can better prepare for the experience.

Most participants required magnification to execute crossing activities. We accommodated this by supplying participants with 2X or 3X power reading glasses, which were very helpful and much appreciated.

Workshop presentation

A link to our workshop content is included so that you can see how we structured and presented the material. I would appreciate it if you would acknowledge me for any ideas, slides, or pictures you use from our material to create your own workshop. The first workshop was used for the FFA students and requires about 2.5 hours to present. It contains more pictures for visual explanation of required procedures. The second workshop was modified for presentation after a field day and can be presented in 1.5 hours. If you have any questions about the workshop or the material presented, please feel free to contact me at ahcarter@wsu.edu. I would be happy to provide you with additional information about workshop content and delivery style. I wish all of you great success as you develop your own workshop.

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