

Plant Flagship Genomes

Although we study many plant species of DOE interest, through discussion with the JGI Plant Genome Advisory Committee and DOE, a set of JGI plant genomes that are the most important to DOE mission and plant science have been designated as JGI Plant Flagship Genomes. This selected set of critical species allows us to focus our computational and experimental efforts to move beyond sequence to function and to provide the most direct benefit to mission science. The current JGI Plant Flagships for crop production are:

Poplar (*Populus trichocarpa*)– the “DOE tree”, the focus of biomass and cellulosic research for woody stem production

Switchgrass (*Panicum virgatum*) – a perennial grass biofuel feedstock that grows on marginal soil and is being explored by all of the DOE BioEnergy Research Centers as a major production species

Miscanthus (*sinensis & sacchariflorus*)– a perennial grass species that produces large amounts of cellulosic material with low inputs, one of the top production feedstock candidates

Sorghum (*bicolor*) – a widely planted grass crop that serves as a nearby model to switchgrass and miscanthus, sorghum is widely used as an experimental plant model for panicoids and is planted as a current crop species in the US

In addition to these production cellulosic crop species, we include several model organisms as Plant Flagships. These models allow detailed molecular experiments which inform gene function within the production species:

Brachypodium (*distachyon*) – small, inbred grass model organism, developed by the JGI, that allows quick transformation and large mutation based resources for gene function experiments

Wild Foxtail Millet (*Setaria viridis*) – a compact grass model for gene function experiments closely related to switchgrass and miscanthus with a short generation time

Hall's Panicum (*Panicum hallii*) – a small, inbred, evolutionary nearby diploid relative of switchgrass that serves as laboratory model organism for switchgrass research

Physcomitrella (patens) – moss model organism, the basic comparator for land plants

Chlamydomonas – the most studied algal species, the model photosynthetic algal organism, originating before modern land plants

As the DOE focus on lipid and chemical production in plants has grown, we now include significant amounts of research on oil seed plants for production, these include:

Soybean (*Glycine max*) – the number 2 crop in the US, produces oil used for soydiesel

Camelina (*sativa*) – produces vegetable oil and can be grown overwinter or as a summer crop

Pennycress (*Thlaspi arvense*) – a promising overwinter cover crop for oilseed production, currently under development

Physcomitrella – moss model organism, basic comparator for land plants