Switchgrass– A Valuable Biomass Crop for Energy


Switchgrass (Panicum virgatum L.) is a warm-season C₄ perennial grass, native to the prairies and steppes of North America, which is being developed for use as a so-called second-generation biomass energy crop, mainly in North America. Switchgrass has in fact been used in pastures and for conservation planting in the Great Plains and the U.S. Midwest since the 1940s, but in 1991, it was selected as the model perennial grass biomass species by the U.S. Department of Energy. It is perhaps surprising therefore that this book is the first devoted entirely to switchgrass, but the current timing gives an opportunity for contributors to synthesize the large amount of publications that have emerged in the period since 1991.

In the book, a number of authorities on the development and use of switchgrass for bioenergy have reviewed and summarized by major topic areas the past and current scientific literature on switchgrass. The first five chapters in the book provide information on the evolution of switchgrass as an energy crop, its breeding, genetics and genomics, physiology, management and harvest, and storage. These are followed by three chapters on the environmental impacts of switchgrass cultivation, its biochemical and thermochemical conversion to biofuel, and finally an analysis estimating the region-specific costs to produce and deliver switchgrass. The stated aims of the editor have been to combine the recent but significant knowledge acquired in Europe with the more substantial and consolidated North American knowledge and to stimulate a synergy in multidisciplinary communications among scientists and stakeholders, as well as in parallel research and development programs in Europe, North America and elsewhere. However, because the vast majority of the authors are based in North America, the first of the objectives has been difficult to achieve and we are left with the clear impression that switchgrass is not the favored second-generation biomass crop for energy in Europe; instead, we appear to know a lot more about Miscanthus x giganteus on this continent. This is intriguing because when a carefully parameterized biophysical model was recently used to explore the productivity of the two potential feedstocks throughout the conterminous United States, Miscanthus x giganteus was, on average, 2.2 times more productive than switchgrass (Miguez et al., 2012). However, choices about use of biofuels, while strongly influenced by maximizing harvestable yield, will be determined by a whole range of other factors that influence the production chain from planting to utilization.

In conclusion, this book provides an extremely valuable source of information on all aspects of the potential use of switchgrass as an energy crop. It might, however, have been even more useful if there were more comparisons between switchgrass and other potential second-generation energy crops, including Miscanthus x giganteus. Nevertheless, it will provide an important point of reference for any researchers embarking on work on biofuels as well as informing the decision makers who will ultimately decide if energy from biofuels has a viable future. Unfortunately, priced at €99.95 in hardback, the book may be outside their price range for many individual researchers to purchase it and they will be relying on institutional libraries for access to the book.

References


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