Biofuels produced from lignocellulosic feedstocks are likely to displace substantial amounts of petroleum. The biofuels industry has identified elephantgrass (*Pennisetum purpureum* Schum.) as one of the most productive feedstocks for lignocellulosic biofuel production in the southern US. Elephantgrass also called napiergrass has been introduced to all tropical and subtropical areas of the world because of its ability to produce large amounts of high quality forage biomass. However, elephantgrass produces large amounts of wind dispersed seeds and is listed as invasive (Category I) by the Florida Exotic Pest Plant Council. Plant propagation and establishment of new elephantgrass plantings occurs through vegetative plant parts. Therefore, unlike most seeded crops, seed production is not necessary for elephantgrass biomass production and its suppression will significantly reduce its potential for invasiveness. Pearl millet (*Pennisetum glaucum* L.) is one of the most drought tolerant C4 grass. Interspecific hybridization between elephantgrass (tetraploid) and pearl millet (diploid) is expected to result in triploid hybrids with male and female sterility which will eliminate production of wind dispersed seeds. Tall, stress tolerant parents were chosen with the goal to generate interspecific hybrids with good productivity and persistence as well as male and female sterility. We produced more than 3000 triploid, interspecific hybrids between elephantgrass and pearl millet. Phenotypic variability present in these hybrids allowed selecting seedless lines which produced similar or higher biomass amounts as the seed producing elephantgrass cultivar Merkeron. We will present data describing the seedless nature of the interspecific hybrids, their biomass yield and related traits during 2010 and 2011 under irrigated or non-irrigated conditions. The development of a genetic transformation protocol for sterile, interspecific hybrids and the introduction of a flowering suppressor gene through transgenic technology will also be described.