

Center for Community-Based Resource Management (CBRM)

Natural Resources Institute, University of Manitoba

CBRM Database

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| Date: | 30/Nov/2014 | Entry Number: | 1342 |
| Case Study Name: | Responses of 20 native tree species to reforestation strategies for abandoned farmland in Panama | | |
| Authors: | Elaine Hoper, Richard Condit and Pierre Legendre | | |
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| Region: | North America | | |
| Country: | Canada | | |
| Ecosystem Type: | Tropical grassland | | |
| Social Characteristics: | Urban communities | | |
| Scale of Study: | National scale | | |
| Resource Type: | Forestry | | |
| Type of Initiative: | Research driven-project | | |
| Community-Based Work: | Conservation | | |
| Keywords: | abandoned farmland; exotic grasses; fire effects; natural regeneration; Panama; Saccharum | | |

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| | spontaneum; secondary succession; shade tolerance; tropical reforestation. |
| Summary: | <p>Deforestation in the tropics often leads to unproductive agriculture and results in abandoned, degraded grasslands that tree species recolonize poorly. To evaluate why forests do not regenerate naturally and to identify potential species for use in reforestation of degraded areas, we planted 15 000 seeds of 20 native tree species, varying in seed size and shade tolerance, in abandoned Panamanian farmland dominated by the exotic grass, <i>Saccharum spontaneum</i>. To determine the effects of above- and belowground constraints on tree seedling germination, survival, and growth, we used four mowing and shading treatments of the <i>Saccharum</i>. Shading the <i>Saccharum</i> effectively eliminated it, whereas mowing led to increased light aboveground, but did not reduce <i>Saccharum</i> growth rate. Germination, survival, and growth of tree seedlings approximately doubled in shade treatments compared to the unshaded control, but were lowest when the <i>Saccharum</i> was mowed three times. Fire significantly decreased germination and survival. Some species did not follow these general trends, however; we identified four species groups that varied in their response to <i>Saccharum</i> competition. Very small-seeded, light-demanding species performed poorly, and we do not recommend their use in reforestation because they tolerate neither above- nor belowground constraints imposed by the <i>Saccharum</i>. Light-demanding species with large seeds were limited by aboveground constraints, namely, shading. Small-seeded, shade-tolerant species were limited by belowground constraints imposed by the <i>Saccharum</i>. Large-seeded, moderately to highly shade-tolerant species performed well in the <i>Saccharum</i>; we recommend a reforestation strategy that includes planting this last group. Key</p> |