

scorch on seedlings, which local farmers attribute to presence of *Urochloa ruzizensis* and may be a result of competition with grasses for water.

Seedling survival also differed between soil inocula. Survival was lower for seedlings inoculated with pasture soil (19%) than for seedlings inoculated with forest soil (26%) (Table 2.1; Figure 2.3). The effect of soil inoculum did not vary from site to site or between habitats (Table 2.1). The difference in mortality risk between forest and pasture soil inocula calculated throughproportional hazards analysis is small: for every ten seedlings inoculated with pasture soil that die, 8.7 seedlings inoculated with forest soil would be expected to succumb as well (Table 2.1).

The time at which benefits of forest soil inoculation for survival were observed differed between habitats and sites (Figure 2.3). In pasture, mortality was not lower for seedlings inoculated with forest soil than seedlings inoculated with pasture soil until the onset of the first dry season. In forest at all three sites and in pasture at the Cascante site, lower mortality for seedlings inoculated with forest soil could be observed immediately after outplanting. By the onset of the second rainy season eight months after outplanting, there was no longer a difference in mortality between soil inocula except at the Delgado site.

Seedlings grew quickly at pasture sites. Mean estimated biomass of pasture seedlings increased from 0.8 g at five months to 105.5 g at 24 months after outplanting (Figure 2.4; repeated-measures ANOVA: $F_{5,585} = 1796.47$, $P < 0.0001$). In contrast, seedlings at the Delgado forest site barely grew ($F_{5,35} = 4.81$, $P = 0.0490$). Mean estimated biomass of forest seedlings increased from 0.5 g at five months to 1.8 g at 24 months after outplanting at the Delgado forest site (Figure 2.4). Seedling growth in pastures differed

between sites. Mean estimated seedling biomass 24 months after outplanting was considerably lower in the Ramírez pasture than at the other two pasture sites (Figure 2.4; $t_{122} = 8.66$, $P < 0.0001$).

Soil inoculum had little effect on the size of surviving seedlings in pastures. Estimated biomass of pasture seedlings differed between soil inocula only at the Cascante site five months after outplanting (Figure 2.4; $t_{55} = 3.28$, $P = 0.0018$). There was no apparent effect of soil inoculum on seedling growth in forest at the Delgado site (Figure 2.4;), although by the end of the experiment sample sizes were small. Seedlings did not survive long enough at the other two forest sites to permit growth comparisons.

Light and relative humidity differences between habitats

Seedling survival was strongly affected by light environment. Survival increased with increasing light availability (Figure 2.5). Six months after outplanting, seedling mortality in the forest was much higher at low to intermediate light levels (0-66% of full sunlight) than at high light levels (67-99% of full sunlight; $\chi^2_{1,295} = 28.18$, $P < 0.0001$). A greater proportion of forest seedlings experienced high light conditions at the Delgado site (25%) than at either the Ramírez (10%) or Cascante (6%) sites.

Relative humidity differed between habitats. Mean relative humidity was higher in forest (94%) than in pasture (84%; $F_{1,122} = 97.94$, $P < 0.0001$; Figure 2.6). While there was no difference in maximum daily relative humidity between forest and pasture in either season ($F_{1,122} = 1.40$, $P = 0.2392$), minimum daily relative humidity was much lower in pasture than in forest ($F_{1,122} = 173.26$, $P < 0.0001$). The difference in relative humidity between forest and pasture was particularly pronounced during the wet season, when