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Regeneration of Longleaf Pine in Canopy Gaps: Evidence for Presence of a Root Gap.

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Factors responsible for a seedling exclusionary zone (SEZ), a wide perimeter surrounding naturally regenerated longleaf pine seedlings clustered at canopy gap centers were measured at 1-24m from gap edges in an uneven-aged forest. Greater litter mass ≤ 4 m of the gap edge (4.5 Mg/ha) could result in higher intensity fires than would be supported by litter near the gap center (2.5 Mg/ha). Fine root biomass found ≤12 m of the gap edge (3-4.5 Mg/ha) was 2-6 times that measured near the gap center and closely coincided with the width of the SEZ. Thus, while the canopy of adjacent adult trees indirectly influences seedling mortality through grater litter deposition leading to higher fire intensity ≤ 4 m of the gap edge, the roots of adults directly compete with seedlings ≤ 12-16 m of the gap edge for limited site resources. Interior to the SEZ. ≤16 m from the canopy gap edge, a well defined fine root gap was associated with an abundance of naturally regenerated pine seedlings. This zone of intraspecific competition and the corresponding root gap need to be considered in silvicultural treatments to sustain the longleaf pine wiregrass ecosystem.