Gene flow across a fragmented landscape in the hummingbird pollinated timber species 
*Symphonia globulifera* (Clusiaceae)

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Forests in Costa Rica are threatened by:

- Monoculture tree plantations
- Agriculture
- Pasture
- Urban Systems
- Hotel Resorts
Fragmentation and loss of Habitat

Alters gene flow patterns in trees

Lower effective population size  Increase inbreeding  Loss of adaptive ability  Extinction
Symphonia globulifera
Clusiaceae

- Economic Importance:
  - Timber
  - Medicinal properties

- Distributed
  - Mexico to Brazil
  - Equatorial Africa

- Hermaphroditic Species

- Hummingbird pollinated

- Fruit Dispersal:
  - Bats
  - Birds
  - Monkeys
Seedlings

20 Seedlings

Sym54 T

FSGS: 1 ha plot

Axis X (m)

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70

Axis Y (m)

0 10 20 30 40 50 60
Fine Scale Genetic Structure

Seedlings

Adults NO FSGS
Continuous Forest

Forest Fragment

Seedling Genetic Structure
Continuous Forest
Forest Fragment
69% Paternity of seedlings in Continuous Forest

N1

N2

S1

S2

27% Pollen Flow

2% Seed Flow

98% Exclusion Probability

N: 172
Paternity of seedlings in the Forest Fragment

Pollen Flow: 36%
Seed Flow: 9%

98% Exclusion Probability
N: 187

Paternity of seedlings in the Forest Fragment
Gene Flow of the Sym54 sibs (n:12) in the Southern Site in the Golfo Dulce Forest Reserve (GDFG), Osa Peninsula, Mogos (8° 25' - 8° 50' N, 83° 15' - 83° 45' W)
Conclusions

- Fragmentation alters gene flow

- Gene flow occurs across disturbed habitats
  - Importance of continuous forest
  - Seeds can also colonize new habitats (Hamrick et al. 2011)

- Asymmetric gene flow from continuous forest INTO forest fragments
  - Genetic “rescue”
  - “Source-sink”
  - High diversity and low inbreeding

- Highlights the importance of isolated trees as stepping stones for gene flow
Thank you

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