

Genetic Diversity and Restoration Success



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FOUNDED 1899

Cottonwood



Ecology

Management Implications

1. Restoration success
2. Appropriate habitat
3. Diverse plantings

Western red bat

Western yellow bat

Yuma hispid cotton rat

Yellow-billed cuckoo

Elf owl

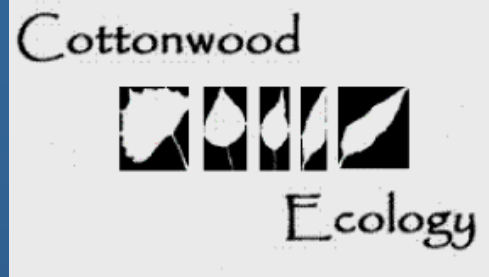
Gilded flicker

Vermilion flycatcher

Arizona Bell's vireo

Sonoran yellow warbler

Summer tanager



Do genetics affect ecosystem functions?



How does genetic diversity affect restoration?

Past research

Present planting

Future ecology and
restoration



Ogden, Utah

Photo from
Randy as
background

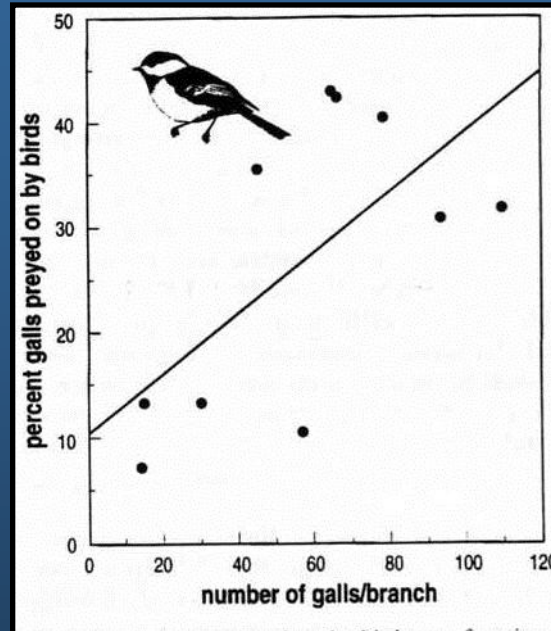


The effects of genetic diversity

Arthropod richness ↑ 32%
abundance ↑ 26-52%



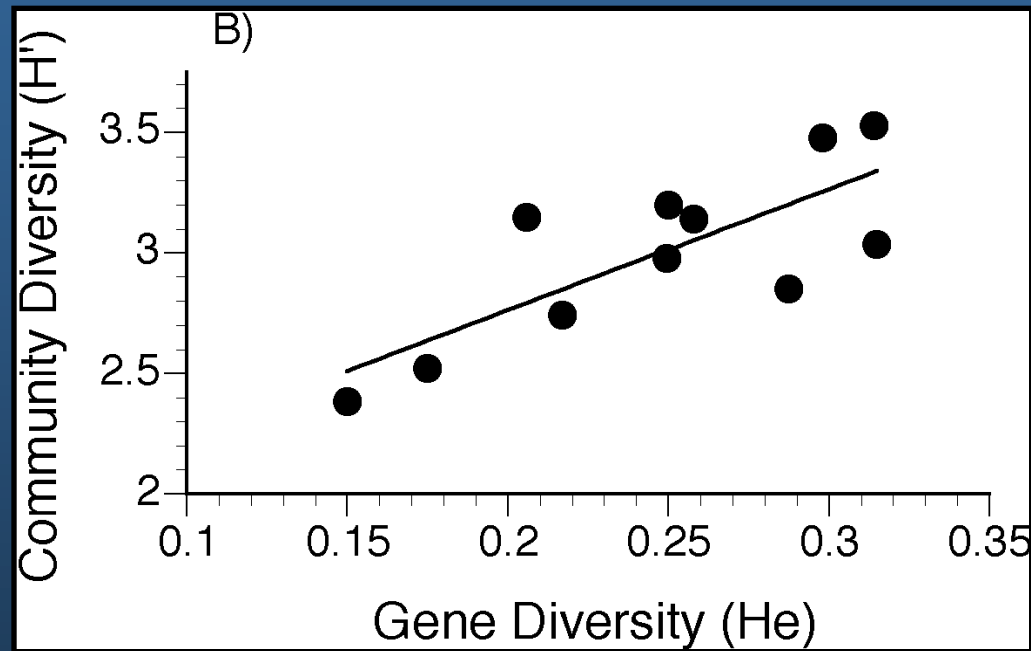
The effects of genetic diversity



Cottonwood genetics \Rightarrow *Pemphigus betae* \Rightarrow
arthropod communities \Rightarrow bird predators

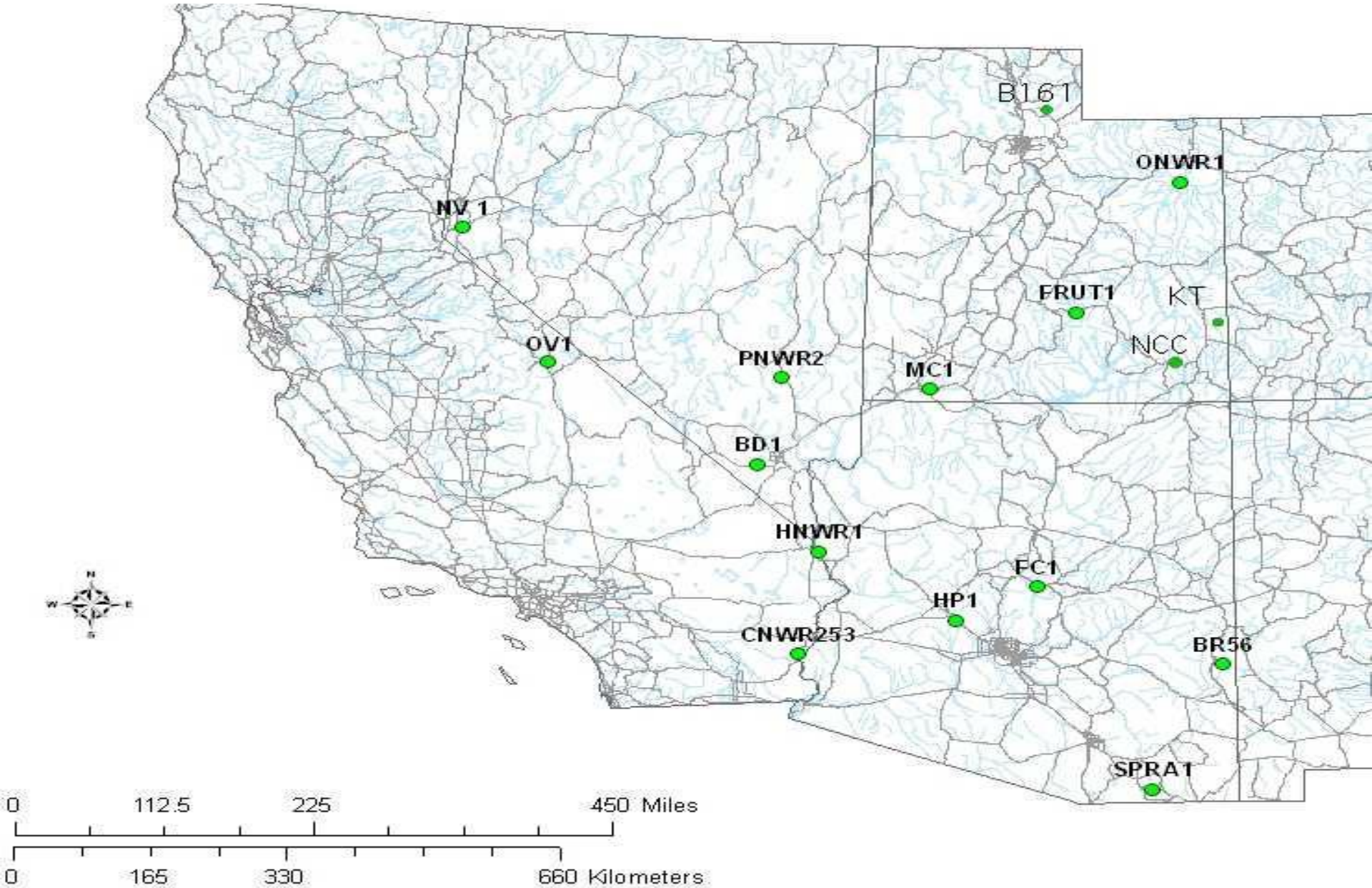
$$r^2 = 0.42, p < 0.05$$

The effects of genetic diversity



$$r^2 = 0.59, p = 0.006$$

Cibola diversity garden collection sites





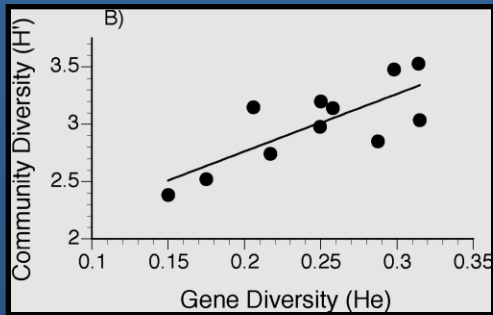
CNWR

10,000 trees

40 acres

4 m centers

Diversity Garden



- 1 genotype
- 2 genotypes
- 4 genotypes
- 8 genotypes
- 16 genotypes

OV	OV	OV	OV	ONWR	ONWR	ONWR	ONWR	FRUT	FRUT	FRUT	FRUT	SPRA	SPRA	SPRA	SPRA
OV	OV	OV	OV	ONWR	ONWR	ONWR	ONWR	FRUT	FRUT	FRUT	FRUT	SPRA	SPRA	SPRA	SPRA
OV	OV	OV	OV	ONWR	ONWR	ONWR	ONWR	FRUT	FRUT	FRUT	FRUT	SPRA	SPRA	SPRA	SPRA
OV	OV	OV	OV	ONWR	ONWR	ONWR	ONWR	FRUT	FRUT	FRUT	FRUT	SPRA	SPRA	SPRA	SPRA
SPRA	SPRA	CW	CW	KT	KT	KT	KT	HP	HP	HP	HP	CW	CW	CW	CW
CW	CW	CW	CW	KT	KT	KT	KT	HP	HP	HP	HP	CW	CW	CW	CW
SPRA	SPRA	SPRA	SPRA	KT	KT	KT	KT	HP	HP	HP	HP	CW	CW	CW	CW
SPRA	CW	SPRA	CW	KT	KT	KT	KT	HP	HP	HP	HP	CW	CW	CW	CW
CNWR	CNWR	CNWR	CNWR	NCC	NCC	NCC	NCC	HNWR	HNWR	HNWR	HNWR	ONWR	NV	BD	B161
CNWR	CNWR	CNWR	CNWR	NCC	NCC	NCC	NCC	HNWR	HNWR	HNWR	HNWR	OV	CW	CW	B161
CNWR	CNWR	CNWR	CNWR	NCC	NCC	NCC	NCC	HNWR	HNWR	HNWR	HNWR	NV	OV	MC	BD
CNWR	CNWR	CNWR	CNWR	NCC	NCC	NCC	NCC	HNWR	HNWR	HNWR	HNWR	ONWR	KT	KT	MC
PNWR	PNWR	PNWR	PNWR	MC	FC	CNWR	FC	NV	NV	NV	NV	SPRA	HP	FC	CNWR
PNWR	PNWR	PNWR	PNWR	CNWR	MC	FC	CNWR	NV	NV	NV	NV	NCC	KT	HNWR	FRUT
PNWR	PNWR	PNWR	PNWR	ONWR	CNWR	MC	ONWR	NV	NV	NV	NV	NV	PNWR	CW	MC
PNWR	PNWR	PNWR	PNWR	FC	ONWR	ONWR	MC	NV	NV	NV	NV	ONWR	OV	B161	BD
FC	FC	FC	FC	BD	BD	BD	BD	MC	MC	MC	MC	B161	B161	B161	B161
FC	FC	FC	FC	BD	BD	BD	BD	MC	MC	MC	MC	B161	B161	B161	B161
FC	FC	FC	FC	BD	BD	BD	BD	MC	MC	MC	MC	B161	B161	B161	B161
FC	FC	FC	FC	BD	BD	BD	BD	MC	MC	MC	MC	B161	B161	B161	B161

Ecological Data

Soil and canopy arthropods

Fungi

Birds

Mammals

Herps

Nutrient cycling

Water use

Tree performance

Herbaceous understory



Research and Restoration



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Cottonwood Ecology Group

