Your dissertation title here

By

Your name

A dissertation submitted in partial fulfillment of
the requirements for the degree of

Doctor of Philosophy

(Botany)

at the

UNIVERSITY OF WISCONSIN–MADISON

2016

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The dissertation is approved by the following members of the Final Oral Committee:

advisor, Professor, Botany
committee, Associate Professor, Zoology
committee, Professor, Botany
committee, Professor, Zoology
committee, Professor, Botany

For ...

Acknowledgments

This dissertation would not have been possible without the support, guidance, inspiration, encouragement and friendship of many people.

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Abstract

Your dissertation title here

Your name

Under the supervision of Professor xxx

At the University of Wisconsin–Madison

Abstract here...

Introduction

We are living in an era of rapid changes characterized by shifts in climate, land use, nitrogen deposition and biological invasions among other changes. Ecosystems are increasingly affected by anthropogenic and natural disturbances that profoundly influence biodiversity and ecosystem functioning (Naeem et al., 2009).

References

Naeem, S., D. E. Bunker, and A. Hector. 2009. Biodiversity, ecosystem functioning, and human wellbeing: an ecological and economic perspective. Oxford University Press, USA.

Chapter 1 – chapter one title here

Author 1 and Author 2

Department of Botany, University of Wisconsin-Madison, Madison, WI, 53706 USA

Citation:

Authors. 2015. Title. Journal. 96:1030–1041

Abstract:

Fire suppression throughout the twentieth century greatly altered plant communities in fire-dominated systems across North America. ... Our findings highlight the key role fire plays in shaping the assembly of these pine-barrens communities.

Key words*: plant community change, ..., Wisconsin.*

Introduction

Anthropogenic and natural disturbances profoundly affect biodiversity and ecosystem functions (Naeem et al., 2009).

Methods

Study sites and area

The CSP covers $885,800$ ha, representing 6.1% of the land area of the Wisconsin state.

Results

Changes in community structures

Over the past 54 years, tree density has decreased 24% (from 724 to 550 *trees/ha*; paired-$t_{29} = -3.31$, $p = 0.003$) while the average DBH per stem has increased 15% (from 19 to 22 *cm*/*tree*; paired-$t_{29} = 3.94$, $p = 0.0004$).

Discussion

In this study, we documented ...

Acknowledgments

We thank...

References

Naeem, S., D. E. Bunker, and A. Hector. 2009. Biodiversity, ecosystem functioning, and human wellbeing: an ecological and economic perspective. Oxford University Press, USA.

Tables:

Table 1. Results of changes .

	Mean relative quadrat frequency (± SD)		
	1958	2012	*P*-value
Plant growth habit			
Forb	0.461(±0.083)	0.284(±0.066) ↓	$p < 0.0001$
Fern /fern ally	0.004(±0.008)	0.017(±0.020) ↑	$p = 0.0004$
Graminoid	0.065(±0.100)	0.124(±0.069) ↑	$p = 0.0058$
Woody	0.467(±0.110)	0.574(±0.059) ↑	$p < 0.0001$
Plant origin			
Exotic	0.007(±0.026)	0.017(±0.033) ↑	$p = 0.061$
Native	0.993(±0.026)	0.983(±0.033) ↓	$p = 0.061$

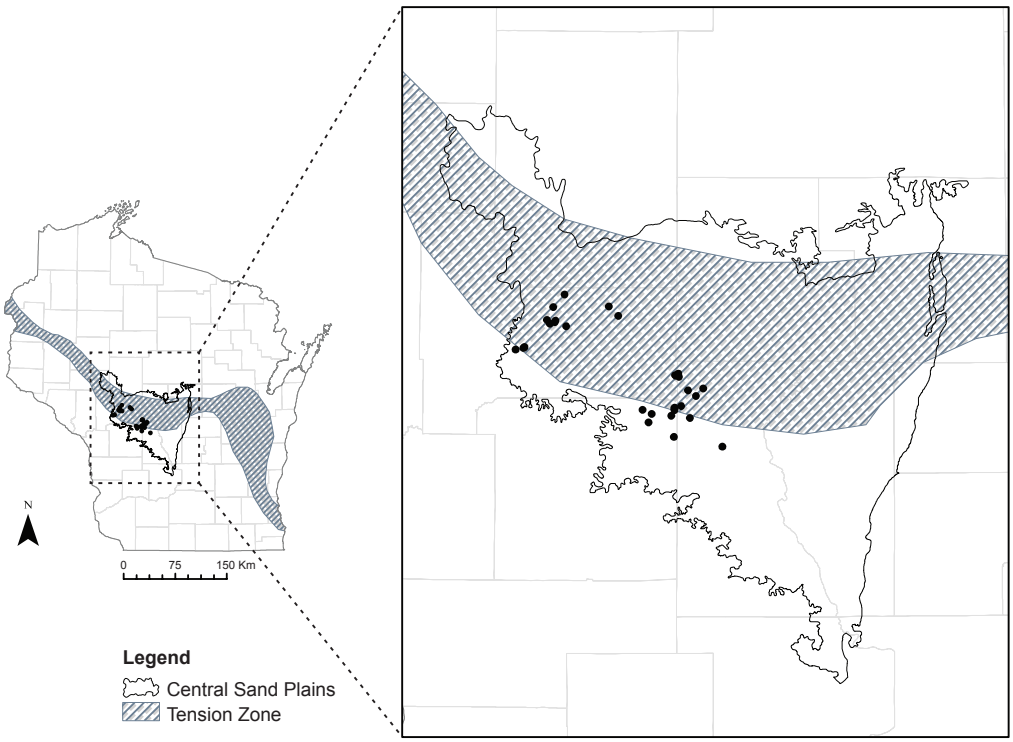

Figure 1. Map of the 30 study sites in the central sand plains of Wisconsin.

Figures:

Figure 1. Map of the 30 study sites in the central sand plains of Wisconsin.

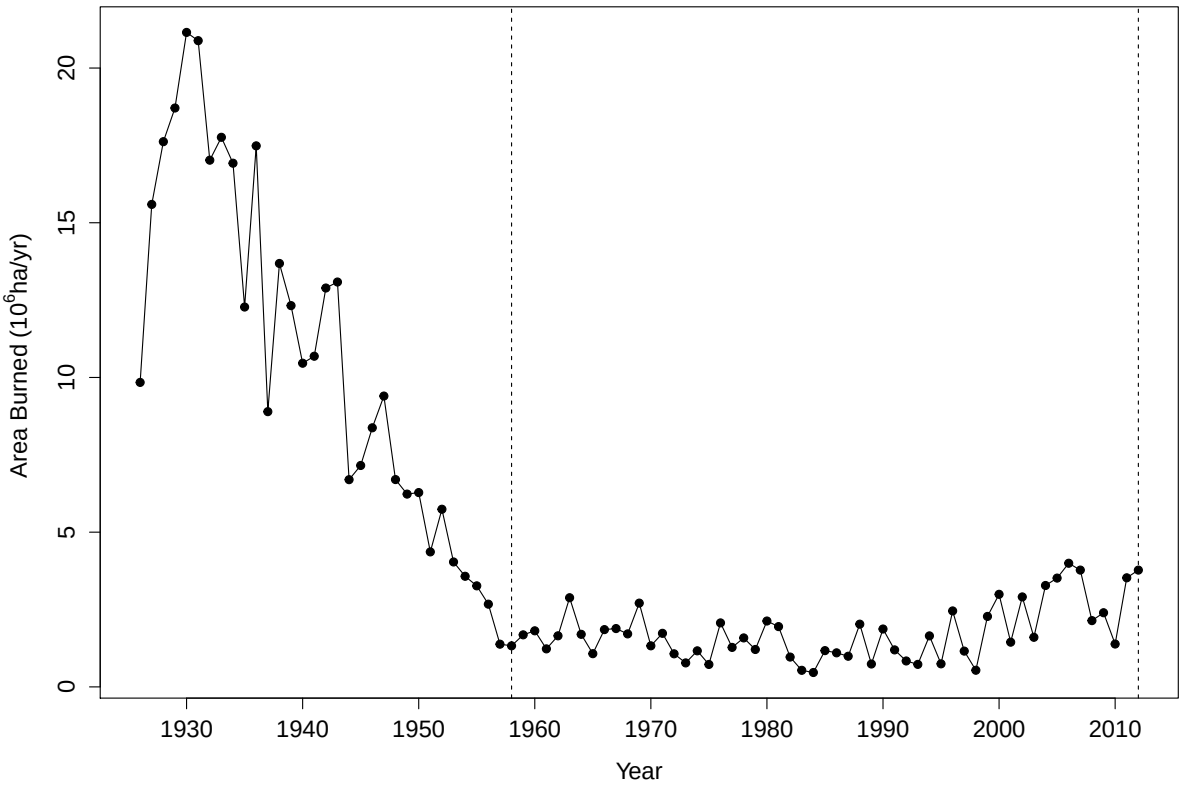

FIG. A1. Fire burning extent in the United States in millions of hectares per year from 1926 to 2012.

TABLE A1. Results of indicator species analysis.

	Taxon	Site #(1958)	Site #(2012)	Quadrat %(1958)	Quadrat %(2012)	Status
1	*Acer rubrum*	21	30	31.67	63.87	winner
2	*Achillea millefolium*	7	1	1.67	0.07	loser
3	*Amelanchier spp*	14	23	5.00	8.27	winner
4	*Andropogon gerardii*	6	1	4.83	0.53	not change
5	*Anemone quinquefolia*	3	9	0.83	2.93	winner
6	*Antennaria spp*	12	1	5.33	0.07	loser
7	*Apocynum androsaemifolium*	18	18	6.17	4.67	not change
8	*Aralia nudicaulis*	13	14	8.33	3.53	not change
9	*Arctostaphylos uva-ursi*	3	1	1.50	0.07	not change
10	*Aronia melanocarpa*	0	22	0.00	10.00	winner

Chapter 2 – chapter one title here

Your name* and Your advisor

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Abstract:

Plant community functional traits allow us to mechanistically link changes in species composition to changes in ecosystem functions.

Keywords: long-term community assembly; functional diversity.

Introduction

Global biodiversity is changing at an unprecedented rate in response to ongoing anthropogenic global environmental changes (Sala et al., 2000).

Methods

Study sites and vegetation data

We re-sampled 30 sites in the central sand plains (CSP) of Wisconsin in 2012 first sampled by James Habeck in 1958.

Results

Changes in environmental conditions

Both stand characteristics and climatic conditions have changed since 1958. Average canopy cover, average annual precipitation, average annual temperature, and average temperature of the coldest month in these communities have all increased (Fig. 1, paired t-tests, all $p \ll 0.001$).

Discussion

Widespread changes in disturbance regimes make it critical to understand the long-term impacts of disturbance on the taxonomic and functional diversity of plant communities.

Conclusions

These pine barrens communities have increased in local functional diversity while converging in functional composition across sites.

Acknowledgments

We thank James R. Habeck for his original sampling effort.

References

Sala, O. E., F. S. Chapin, J. J. Armesto, E. Berlow, J. Bloomfield, R. Dirzo, E. Huber-Sanwald, L. F. Huenneke, R. B. Jackson, A. Kinzig, R. Leemans, D. M. Lodge, H. A. Mooney, M. Oesterheld, N. L. Poff, M. T. Sykes, B. H. Walker, M. Walker, and D. H. Wall. 2000. Biodiversity - Global biodiversity scenarios for the year 2100. Science, **287**:1770–1774.

Tables:

Table 1. List of functional traits used in this study.

Trait (Abb.)	Description	Related function	Life-cycle phase
Pollination mode (Biotic.Polli)	Biotic or Abiotic	Regeneration strategy	*Regeneration*
Leaf nitrogen concentration (LNC)	Total amount of nitrogen per unit of leaf dry mass (%)	Light capture, photosynthetic rate	*Vegetative growth*

Figures:

Figure 1. Changes in canopy cover, annual average temperature, average temperature of coldest month, and annual precipitation of study sites over time.

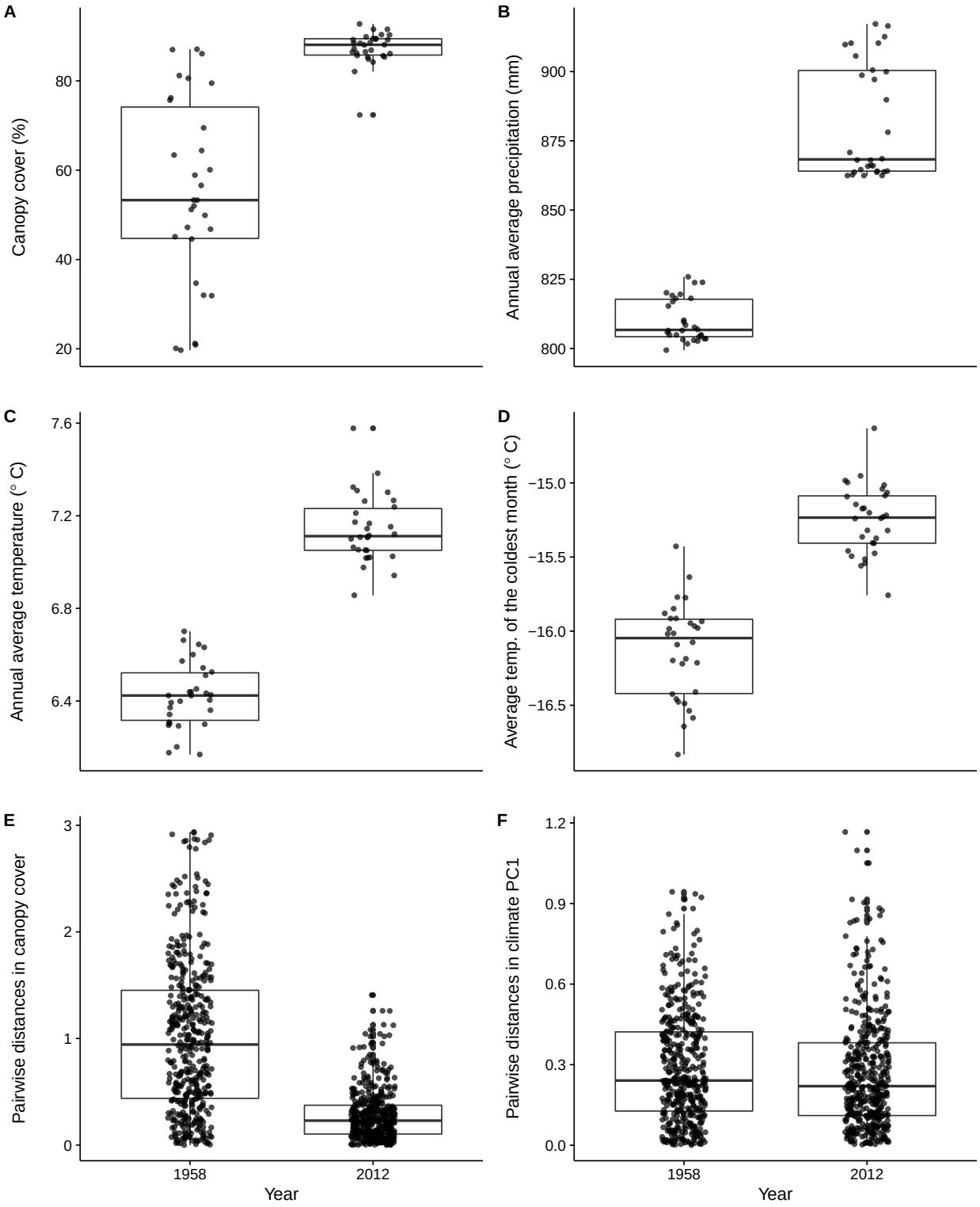
A
Canopy cover (%)
80
60
40
20
B
Annual average precipitation (mm)
900
875
850
825
800
C
Annual average temperature (° C)
7.6
7.2
6.8
6.4
D
Average temp. of the coldest month (° C)
−15.0
−15.5
−16.0
−16.5
E
Pairwise distances in canopy cover
3
2
1
0
1958
2012
Year
F
Pairwise distances in climate PC1
1.2
0.9
0.6
0.3
0.0
1958
2012
Year

Figure 1

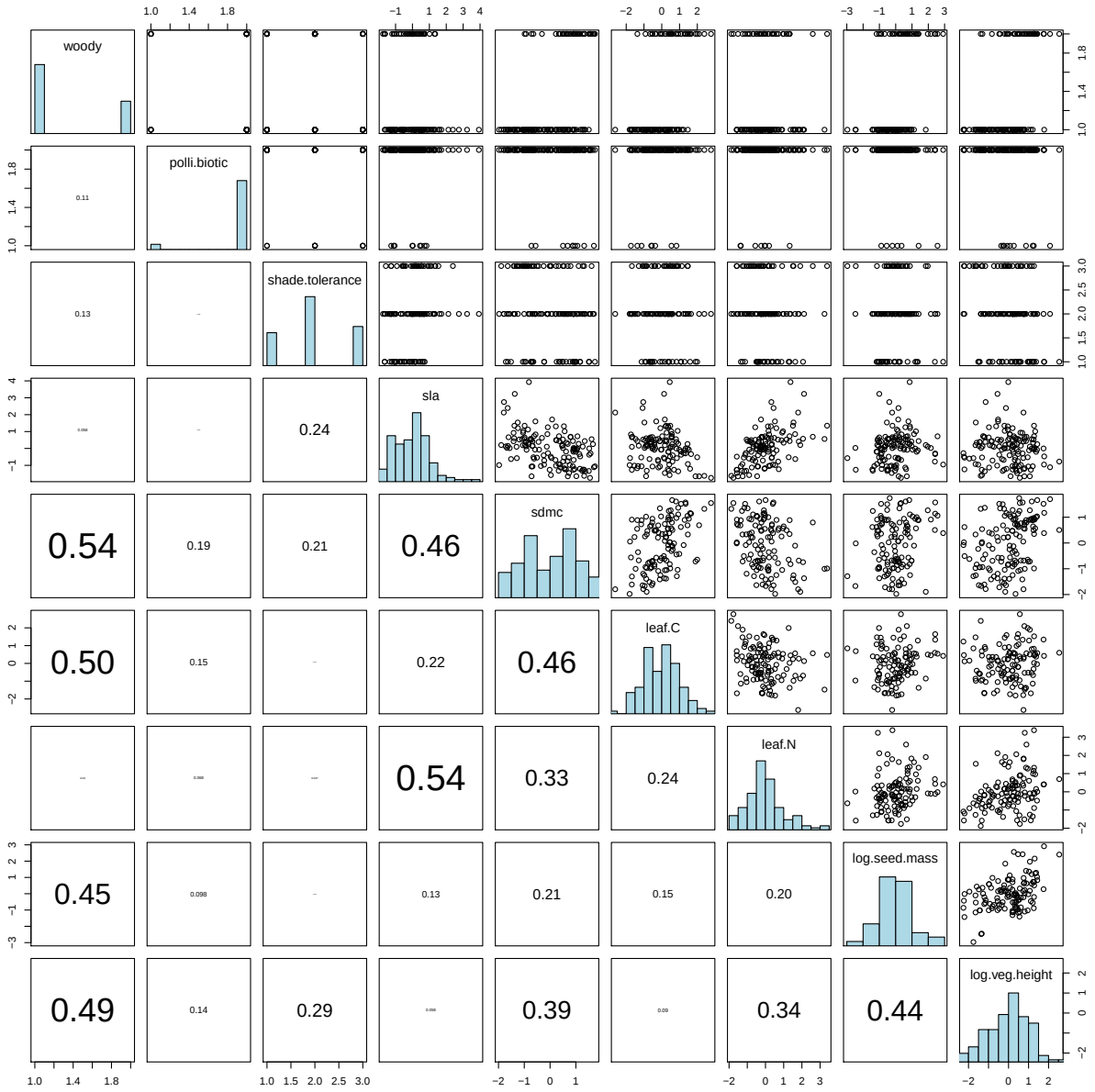

FIG. A1. Distribution of functional traits used in this study and their pairwise correlations (in absolute value).

Appendix: Supplementary materials.

Text A1: Cumulative proportions and loading of PCA based on eight climatic variables.