Evaluation of the effects of tree clearing over time on soil properties, pasture composition and productivity

Kamaljit Kaur Sangha Doctor of Philosophy

Plant Sciences Group School of Biological and Environmental Sciences Faculty of Arts, Health and Sciences Central Queensland University

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Abstract

Tree clearing is practised for greater beef production and hence monetary gains from grazing systems of central Queensland. The high rates of clearing in the past and even recently (577, 000 ha/yr during 1999-2001) were mainly to develop land for pastures. The sustainability of cleared pasture systems over the long-term is questioned.

Three major types of tree communities i.e. *Eucalyptus populnea* F. Muell., *E. melanophloia* F. Muell. and *Acacia harpophylla* F. Muell. ex. Benth. were selected on one property in central Queensland to quantify the impacts of clearing on pasture production and composition, and soil properties. The impacts were measured over time-since-clearing (recent (<5 years), medium (11-13years) and old (>30 years)) in unreplicated cleared pastures in comparison to their replicated uncleared/intact woodland pastures of each tree community.

Measures of pasture above-ground biomass production on a single property over time-sinceclearing in cleared systems showed that gains were not sustained over the long-term. The difference in response to clearing between tree communities was evident and important to support the future policy decisions. The impact of clearing on soil properties (physicochemical and biological) was confirmed, and explained the lesser availability of nutrients with time of clearing in cleared pastures. The changes in some soil properties underscored the associated risks and changes in ecosystem functions due to clearing. Less litter was produced at cleared than uncleared pastures, but nutrient release was faster at cleared compared to uncleared systems. The overall effect of clearing in terms of pasture and litter production, and major soil parameters were analysed using multivariate analyses.

Table of contents

Page
i
ii-iii
iv-vi
vii-ix
Х
xi

1

2

3

Chapter 1. Introduction1-3Research problemAim of researchResearch approach

Chapter 2. Literature review 4-35

Tree clearing	5
Tree clearing – pasture productivity and composition	8
Status of soils with land use change	19
Litter production and decomposition	30
Issues arising out of literature review	32

Chapter 3. Research design 36-59

Introduction	36
Hypotheses	38
Research sites: a case study	39
Statistical methods	50
Testing of hypotheses	59

Chapter 4. Pasture above-ground biomass60-86

Introduction	60
Materials and methods	61
Results	65

Discussion

Chapter 5. Soil physico-chemical properties	87-111	
Introduction		87
Materials and methods		89
Results		91
Discussion		102

Chapter 6. Soil biological properties (respiration and microbial biomass)

112-134	
Introduction	112
Materials and methods	114
Results	120
Discussion	130

Chapter 7. Litter production, decomposition and nutrient release	135-156
Introduction	135
Materials and methods	136
Results	141
Discussion	150

Chapter 8. Synthesis 157-169

Materials and methods	157
Results and discussion	158
Results from hypotheses testing in previous Chapters	165
Key findings	167
Future perspectives	168

Bibliography 170-184

Appendices 185-187

List of Tables

Tables Page Table 2.1 Pasture productivity in various cleared and uncleared grazing systems 10	
Table 2.2 Changes in soil organic carbon with land use change	
Table 3.1 Details of clearing (time, methods and post-clearing treatment) and annual average stocking rate (SR) at cleared and uncleared sites for <i>E. populnea</i> , <i>E. melanophloia</i> and <i>A harpophylla</i> communities	e
Table 3.2 Data for above-ground pasture biomass (average per yr) at fenced plots52	
Table 3.3 Standard errors of differences between various treatments (obtained from REML)	۱.
Table 3.4 Means obtained from REML analysis (arranged in a matrix). 57	
Table 3.5 Treatment differences calculated according to LSD. 58	
Table 4.1 Paired treatments for each of <i>E. populnea</i> , <i>E. melanophloia</i> and <i>A. harpophylla</i> .	
Table 4.2 Average amount of pasture biomass (kg/ha/year) at fenced plots for uncleared and cleared (recent, medium and old age of clearing) treatments for <i>E. populnea, E. melanophloid</i> and <i>A. harpophylla</i> communities.	1 1
Table 4.3 Pasture biomass (kg/ha) in Mar 2001 and Nov 2001 and average annual amount of pasture (kg/ha/yr) at uncleared and recent, medium and old age of clearing	
Table 4.4 Average pasture biomass (kg/ha/yr) in relation to cattle consumption, and grazing pressure (cattle/ha) at cleared (recent, medium and old) and uncleared sites for <i>E. populnea</i> , <i>E melanophloia</i> and <i>A. harpophylla</i> communities. 72	
Table 4.5 Pasture composition (dominant species (>250 individuals of a species/ha/yr)) a	t

Table 4.6 Species number (ha/yr), Shannon Wiener's index of species diversity and average pasture biomass (kg/ha/yr) at uncleared, and at recent, medium and old age of clearing at fenced sites for *E. populnea*, *E. melanophloia* and *A. harpophylla* communities.74

Table 4.8 Species number (ha/yr), Shannon Wiener's index of species diversity and average pasture biomass (kg/ha/yr calculated in relation to cattle consumption) at uncleared, and at

Table 4.10 Chemical composition in terms of C, N and P concentration (%) of cleared and uncleared pasture plants available at *E. populnea*, *E. melanophloia* and *A. harpophylla* tree communities.

 82

Table 5.1 Paired treatments for each of *E. populnea*, *E. melanophloia* and *A. harpophylla*.

Table 6.1 Various treatments to estimate root respiration.
 118

Table 6.3 The mean values (\pm standard error of mean) for microbial and root respiration, rootbiomass, and soil microbial biomass for carbon and nitrogen for all the cleared and theuncleared treatments.125

 Table 7.2 Sampling time for litter production, and for seasonal and longer term

 decomposition.

 138

Table 7.3 Calculations for litter production during different seasons.139

Table 7.4 Litter production (kg/ha) at uncleared and cleared (recent, medium and old age) sites for *E. populnea*, *E. melanophloia* and *A. harpophylla* communities......142

Table 7.7 Mean (\pm standard error of mean) C: N ratio in undecomposed litter at cleared(average for all the three time-since-clearing treatments) and uncleared sites for *E. populnea*,*E. melanophloia* and *A. harpophylla*151

Table 7.8 Release of C, N and P (kg/ha/yr) according to total amount of litter produced at recent, medium and old cleared, and uncleared sites for *E. populnea*, *E. melanophloia* and *A. harpophylla*.

 152

Table 7.9 The potential content of nutrients (kg/ha) stored in litter produced at uncleared, and recent, medium and old cleared sites for *E. populnea*, *E. melanophloia* and *A. harpophylla* communities.

 155

Table 8.3 Hypotheses and their results for various parameters set for cleared pastures.166

List of Figures

Figures Page
Fig 2.1 Average annual rate of clearing for the period of 1999-2001
Fig 2.2 Clearing rates for different land uses7
Fig 2.3 Pasture yield (kg/ha) and tree basal area (m^2 /ha) relationship for <i>A. harpophylla</i> , <i>E. melanophloia</i> and <i>E. populnea</i> (combined source: Burrows 2002)
Fig. 2. 4 Productivity dependence on plant species and functional diversity
Fig 2.5 Inter-relationships between different components of a pasture system
Fig 3.1 An outline of the study for main impacts of clearing and interactions of various components with each other
Fig 3.2 Location of the property "Avocet" and associated regional ecosystems
Fig 3.3 Woodland and grassland communities at 'Avocet'
Fig 3.4 Location of research sites at 'Avocet'
Fig 3.5 Photographs for cleared and uncleared sites for a) <i>E. populnea</i> , b) <i>E. melanophloia</i> and c) <i>A. harpophylla</i> communities
Fig 4.1 Pasture biomass at unfenced and fenced plots for all the treatments (cleared and uncleared) at <i>E. populnea</i> , <i>E. melanophloia</i> and <i>A. harpophylla</i> communities
Fig 4.2 Pasture biomass (kg/ha/yr) and monthly rainfall (mm) at fenced plots for various cleared and uncleared treatments for a) <i>E. populnea</i> , b) <i>E. melanophloia</i> and c) <i>A. harpophylla</i> communities
Fig 4.3 Pasture biomass (kg/ha) and monthly rainfall (mm) at unfenced plots for various cleared and uncleared treatments for a) <i>E. populnea</i> , b) <i>E. melanophloia</i> and c) <i>A. harpophylla</i> communities
Fig 4.4 Biplot for species distribution (\bullet) at uncleared, recent, medium and old cleared unfenced sites (\Diamond) of <i>E. populnea</i>
Fig 4.5 Biplot for species distribution (●) at uncleared, recent, medium and old cleared unfenced sites (◊) of <i>E. melanophloia</i>
Fig 4.6 Biplot for species distribution (\bullet) at uncleared, recent, medium and old cleared unfenced sites (\Diamond) of <i>A. harpophylla</i>
Fig 5.1 Soil bulk density (1), pH_{Ca} (2) and electrical conductivity for cleared and uncleared sites at a) <i>E. populnea</i> , b) <i>E. melanophloia</i> and c) <i>A. harpophylla</i> communities

Fig 5.2 Soil organic carbon, and total and available - P and N at various cleared and uncleared treatments for a) *E. populnea*, b) *E. melanophloia* and c) *A. harpophylla* communities. 95-96

Fig 5.4 Soil exchangeable cations Ca and Mg, Ca/Mg ratio, K, Na, sodium percentage of exchangeable cations (ESP) and CEC at various cleared and uncleared treatments for a) *E. populnea*, b) *E. melanophloia* and c) *A. harpophylla* communities......100-101

Fig. 6.2 Soil microbial (empty bars)- and root (lined bars)- respiration at cleared and uncleared treatments for a) *E. populnea*, b) *E. melanophloia* and c) *A. harpophylla* communities. 122

Fig 8.2 Relationship between first and second canonical variates for cleared (recent, medium and old) and uncleared treatments (with 95 per cent confidence regions around means). 160

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Declaration of originality

This thesis reports the work of the author, except as otherwise stated. It has not been submitted previously for a degree at any university or other institution.

Kamaljit K. Sangha