finalreport

Natural Resource Management

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Workshop on the threat of rubber bush (*Calotropis procera)* on the Barkly Tablelands NT

Executive Summary

The purpose of the meeting held at Helen Springs was to provide a forum that would allow the exchange of information between stakeholder groups in the Barkly region in relation to the perceived threat of rubber bush infestation in the pastoral lands. The group also sought to connect with weed and pasture ecology experts to establish the best way to approach future research into rubber bush.

The meeting was attended by local pastoralists and departmental (DPIFM and DNRETA) staff, departmental staff from other regions and CSIRO officers as well as interstate experts. The Natural Resource Management Board of the Northern Territory was also represented.

At the conclusion of the meeting the group had decided that rubber bush could not be controlled in the Barkly region until certain unknown issues had been qualified. A steering committee and an advisory committee have been established to facilitate the process of designing research and monitoring projects.

Contents

1 Background

A workshop was held at Helen Springs Station in the Northern Territory on the 19 June 2007 to discuss the threat of Rubber bush (*Calotropis procera*) to the pastoral enterprises and natural ecosystems of the area. The workshop was attended by 15 people. The attendees included grazing management, weed and pasture ecology specialists as well as departmental representatives and local pastoralists. The group sought to establish an agreed position on the extent of current knowledge about Rubber bush, its current and potential distribution and the seriousness of the weed infestation threat.

2 Project Objectives

In the initial session of the meeting the group decided on the following objectives:

1. Agreed position on rubber bush in the Barkly Region of the NT and the Gulf region of Qld.
2. Clarify the big issues about rubber bush
    a. Is it invasive or indicative of particular land management?
    b. Its threat to the Barkly Region?
    c. Is control feasible/justifiable?
    d. Options for economically viable control (Fire? Chemical? Biological?)
3. Ecological issues – Is it symptomatic of grazing pressure, season?
4. Identify research requirements
5. Brief for MLA
6. How significant is rubber bush's impact on production systems? Cost to production in dollar terms.
7. Cattle grazing rubber bush – why do we see it eaten in some areas and not in others?
8. Strategic monitoring system (move away from anecdotal evidence – eg VRD)

3 Results and Discussion

3.1 Identification of Issues

After extensive discussion of the issues and experiences pertaining to rubber bush, the group produced a list of known and unknown information about the plant.

KNOWNS:

1. Rubber bush populations increase after big wet seasons
2. The establishment of rubber bush infestations is favoured by disturbance/Rubber bush colonises heavily disturbed areas
3. Rubber bush inhabits all soil types
4. Fire does not have a significant effect on the population of Rubber bush plants in an infestation
5. "Crash" grazing alone is not effective control and has been observed to actually increase the rubber bush population in subsequent seasons
6. Blade ploughing is not cost effective in extensive infestations

7. There is a significant need for a more systematic approach to management and monitoring of rubber bush in the Barkly Region

UNKNOWNS:

1. Drier wet seasons with dense perennial grass populations reduces the ability of rubber bush to colonise through competition for water
2. What are the soil/grass species composition interactions that exist where rubber bush is present?
3. What are the fire/plant interactions that occur in a rubber bush affected area? (effects of type of fire, age of stand, seasonal interactions)
4. Does grazing may reduce seed banks of rubber bush?
5. Are there differences in palatability between plants and between regions?
6. What effect does soil type have on plant chemistry?
7. What influences whether or not cattle graze rubber bush?
8. What is the relationship between grazing pressure/land condition/density/vigour of perennial grasses and rubber bush?
9. What are the factors which effect rubber bush seed dispersal? (wind, hay, cattle, trucks)
10. What are effective methods for controlling Rubber bush? (in terms of timing, method and cost)
11. Is there a real risk of rubber bush populations spreading on the Barkly?
12. What are the biological processes of rubber bush?
13. Is rubber bush an invasive species or a species that if present is indicative of a particular factor (change in environment, change in land condition)

4 Conclusions and Recommendations

4.1 Outcomes

At the conclusion of the meeting the group had agreed that it would not be possible to control rubber bush in the Barkly region of the Northern Territory until certain issues from the “Unknowns” list are qualified.

Five areas of focus were identified as starting points for the further investigation of rubber bush.

1. Changes in Distribution and Spread – **DNRETA, QDPI, Land Holders**
    a. Industry: collect information along GPS-specified lines/points, GPS tag new plants/infestations
    b. DNRETA: Access to weeds database, mapping, format for current monitoring methodology
2. Methods of Control **– DNRETA, QDPI**
    a. DNRETA : Current research write-up
    b. QDPI: Potential to collaborate with current research and compare findings
    c. Additional trialling of products
3. Biology – **Universities, QDPI, DNRETA**
    a. Possible honours/PhD projects through university partners
4. Grazing - **DPIFM**
5. Monitoring – **DPIFM, DNRETA, Land Holders**
    a. Virtual points (Waypoint defined)

b. Range of sites across the Barkly, range of conditions (need to identify the important conditions to monitor)
c. Stratified monitoring system
d. Pasture information: density, species composition, landtype)
e. Rubber bush information: Density, stage of growth, diameter of trunk)
f. Biodiversity monitoring
g. Monitoring within grazing gradient (to relate to grazing pressure, season, conditions)
h. Range of soil and vegetation types
i. Potential for QDPI to operate complimentary/comparative monitoring system in the Gulf region

A steering committee has been established to drive the initiation of future investigative projects.
Steering Committee:

Steve Wingrave – DNRETA, Ruth Allan- DPIFM, Karen May – NRM Board, Wayne Vogler - QDPI, Neil MacDonald/Robyn Cowley- DPIFM, Drew Gracie - BLCA

An advisory committee has also been established to provide technical and expert support to the Steering Committee.
Advisory Committee:

Gary Bastin & Leigh Hunt– CSIRO, Graham Fagan – DNRETA, Geoff Murrell & Suzie Kearins – Industry, Economist (Bill Holmes - QDPI?), Alaric Fisher – DNRETA, Roger Jaensch – International Wetlands Organisation, Reiks Van Klinken - QDPI

Action List:

1. Steering Committee to meet via telephone conference to consider:
    a. The formation of a research project based around the 5 focus areas
    b. Cost of research and possible funding sources
    c. Project management

5 Appendices

5.1 Appendix 1 – Reference Paper

Grace, B.S., 2006, **The biology of Australian weeds 45. *Caltropis procera* (Aiton) W.T. Aiton,** Plant Protection Quarterly, 21:4.

5.2 Appendix 2 – List of Attendees

Delegate	Email	Phone
Steve Wingrave	steve.wingrave@nt.gov.au	89994550
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Drew Gracie	barklylandcare@switch.com.au	89624479
Karen May	karen.may@nt.gov.au	89519264

5.3 Appendix 3 – Minutes of Meeting 19/06/07

Helen Springs Station NT 19th June 2007

Attending:
Neil MacDonald (NTDPIFM), Gary Bastin (CSIRO), Geoff Murrell (S.Kidman & Co – Helen Springs), Karen May (NRM Board NT), Suzie Kearins (AACo), Wayne Vogler (QDPIF), Shane Campbell (QDPIF), Steve Mueller (DNRETA), Michelle Kassman (DNRETA), Claire Dyason (AACo), Drew Gracie (Vic DPI), Robyn Cowley (DPIFM), Steve Wingrave (DNRETA), Ben McGlynn (S.Kidman & Co.- Helen Springs), Ruth Allan (NT DPIFM)

Apologies:

Welcome and Introduction: Neil MacDonald -

Objectives:

At the conclusion of this meeting the participants aim to have met the following objectives:

1. Agreed position on rubber bush in the Barkly Region of the NT and the Gulf region of Qld.
2. Clarify the big issues about rubber bush
    a. Is it invasive or indicative of particular land management?
    b. Its threat to the Barkly Region?
    c. Is control feasible/justifiable?
    d. Options for economically viable control (Fire? Chemical? Biological?)
3. Ecological issues – Is it symptomatic of grazing pressure, season?

4. Identify research requirements
5. Brief for MLA
6. How significant is rubber bush's impact on production systems? Cost to production in dollar terms.
7. Cattle grazing rubber bush – why do we see it eaten in some areas and not in others?
8. Strategic monitoring system (move away from anecdotal evidence – eg VRD)

General Discussion

-*Experiences/questions/insights re: control methods for rubber bush*
DG: Some work done in the region on chemical control but not to any great extent
SW: NRETA Weeds branch questions – Clarification of population dynamics (persistence, establishment, cycles?), Is it invasive of healthy or disturbed landscapes, effect of grazing, bio-control, better management/ viable management options)
SC: -No bio-control investigation yet available in Australia
-10 year time frame
-International research has identified pathogens and insects that may have some capacity for biologically controlling the weed.
-Cost of several million dollars to introduce a bio-control agent
-Rubber bush would be of high priority to a bio-control investigation as genetics are not significantly diverse and there are not any significantly similar native or economically valuable plants that could be potentially endangered by a rubber bush-specific agent.
-pathogens are usually tested over seas, insects are a faster acting bio-control agent than pathogens
- The entire process of a biological control program would probably not be feasible for the control of Rubber bush in the Barkly and Gulf regions given time constraints.
(RC: Observed that the plant flowers year-round but only fruits in the wet- why? Some members of the group suggested it is limited by resources such as water or by conditions like humidity for pollen viability and insect/vector life cycles)

Current Rubber bush situation in the Barkly and Gulf regions of Northern Australia
See appendix for maps of distribution in the Barkly region
Steve Mueller (NRETA) presented map of current distribution – maps showed some areas classed as "widespread and abundant"
Information collected using national standards - same methodology used when collecting information for Weeds of National Significance
No long-term plan to collect more information at this stage
General consensus of the group was that the prominence of rubber bush was increasing in the Barkly region

Rubber bush Ecology and Biology
Steve Wingrave – NRETA
See appendix for presentation notes

-Control: Very difficult weed to control by any method (chemical, physical, mechanical or fire)
-Is the plant an invader or an indicator of certain land management practice?
-In assessing the risk/priority of a potential weed threat NRETA will focus on its IMPACTS and EASE OF CONTROL

-Initial assessment (rudimentary at this stage) of Rubber bush is that it is of MEDIUM IMPACT and VERY DIFFICULT TO CONTROL (physically and economically) hence rubber bush is not currently listed as a priority weed with NRETA
- The result of the assessment of whether Rubber bush is an INVADER or an INDICATOR will determine NRETA response.

Review of Rubber bush in the VRD Rangelands

Gary Bastin – CSIRO

- Presentation of posters
- Anecdotal evidence of invasion, infestation and die-back/plateau of Rubber bush in the VRD. Cyclical population responses to big wet seasons of the 1970's and drier conditions of the 1980's
- Effects of competition by vigorous perennial grasses
- Hypothesis : Rubber bush is symptomatic of something else (disturbed country, seasonality, land management, grazing regime)

Group Discussion:

What is the extent of the group's combined knowledge about Rubber bush

KNOWNS:

- Increase in populations after big wet seasons
- Favoured by disturbance/Colonises heavily disturbed areas
- Inhabits all soil types
- Fire does not have a significant effect
- "Crash" grazing alone is not effective control and has been observed to actually increase the rubber bush population in subsequent seasons
- Blade ploughing is not cost effective in extensive infestations
- There is a significant need for a more systematic approach to management and monitoring of Rubber bush in the Barkly Region

UNKNOWNS:

-Drier wet seasons with dense perennial grass populations reduces the ability of Rubber bush to colonise through competition for water
-Soil/Grass species composition interactions
- Fire/plant interactions (effects of type of fire, age of stand, seasonal interactions
- Grazing may reduce seed banks
- Differences in palatability between plants and between regions
- Effect of soil type on plant chemistry
- What influences whether or not cattle graze it?
-Relationship between grazing pressure/land condition/density/vigour of perennial grasses and rubber bush
- Factors effecting dispersal (wind, hay, cattle, trucks)
- Effective control methods (in terms of timing, method and cost)
- Real risk of spread on the Barkly?
-Plant biological processes
- Indicator or invader species

Field Trip – No 1 Holding Paddock and Jingerah Bore

- No. 1 holding paddock had been crash grazed and subsequently population has increased

- The stand has also been sprayed with limited effect (Access and diesel)
- Significant proportion of the stand is large mature trees
- Jingerah bore until recently had a significant and increasing infestation of rubber bush.
- Approximately 6 weeks ago cattle started to eat the rubber bush plants; all accessible plants have been stripped bare and pruned down to sticks.
- Some of the cows that water at Jingerah would have had exposure to the grazing of rubber bush in the crash grazing event at No 1 holding paddock.
- Fire site in Road Train paddock where a hot fire has had little to no impact on a stand of rubber bush

Actions

-Establish a steering committee

(Steve Wingrave – DNRETA, Harmony James/Ruth Allan- DPIFM, Karen May – NRM Board, Wayne Vogler - QDPI, Neil MacDonald/Robyn Cowley- DPIFM)

-Establish an advisory committee

(Gary Bastin & Leigh Hunt– CSIRO, Graham Fagan – DNRETA, Geoff Murrell & Suzie Kearins – Industry, Economist (Bill Holmes - QDPI?), Alaric Fisher – DNRETA, Roger Jaensch – International Wetlands Organisation., Reiks Van Klinken - QDPI

-5 main areas of focus

1. Distribution and Spread [SURVEY]
2. Methods of Control [RESEARCH]
3. Biology [RESEARCH]
4. Grazing effects [RESEARCH]
5. Effect of the environment (eg. Competition) [MONITORING]

- Role for adaptive management strategies
- In developing a project it was decided to assign the relevant stakeholder group to a focus area

1. Distribution and Spread – DNRETA, QDPI, Industry/Landholders
2. Methods of Control - DNRETA
3. Biology – Universities (CDU), QDPI, DNRETA
4. Grazing effects - DPIFM
5. Effect of the environment (eg. Competition) – DPIFM, DNRETA, Industry/Landholders

-Funding – MLA (sustainable production-based research)
- NRM funding bodies (Regional Investment Strategy)

Focus Areas:

6. Distribution and Spread (Changes in Distribution and Spread)
   - Industry: collect information along GPS-specified lines/points, GPS tag new plants/infestations
   - DNRETA: Access to weeds database, mapping, format for current monitoring methodology
7. Methods of Control
   - DNRETA : Current research write-up
   - QDPI: Potential to collaborate with current research and compare findings
   - Additional trialling of products
8. Biology
   - Possible honours/PhD projects through university partners
9. Grazing

10. Monitoring
    - Virtual points (Waypoint defined)
    - Range of sites across the Barkly, range of conditions (need to identify the important conditions to monitor)
    - Stratified monitoring system
    - Pasture information: density, species composition, landtype)
    - Rubber bush information: Density, stage of growth, diameter of trunk)
    - Biodiversity monitoring
    - Monitoring within grazing gradient (to relate to grazing pressure, season, conditions)
    - Range of soil and vegetation types
    - Potential for QDPI to operate complimentary/comparative monitoring system in the Gulf region

Close of Meeting

As a group comprising of various stakeholders in the Barkly region, we are not currently in a position to control Rubber bush in our area until certain unknowns have been qualified.

APPENDICES:

1. Grace, B.S., 2006, **The biology of Australian weeds 45. *Caltropis procera* (Aiton) W.T. Aiton,** Plant Protection Quarterly, 21:4.
2. DNRETA – Weeds Management Branch, Tennant Creek, **Distribution Map of Rubber bush in the Northern Territory**
3. DNRETA – Weeds Management Branch, Tennant Creek, **Distribution Map Of Rubber bush in the Barkly region of the Northern Territory**
4. S. Wingrave, 2007, **Rubber bush (*Calotropis procera)* in the NT, the current and potential issues, solutions,** NRETA Weeds Management Branch – *POWER POINT PRESENTATION*