Final Report
for the
Rural Industries Research and Development Corporation

APPENDIX 4

Review of Pasture Growth Data in Queensland

Appendix 4 for Final Report DAQ-124A
EVALUATING THE RISKS OF PASTURE AND LAND DEGRADATION IN NATIVE PASTURES IN QUEENSLAND

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ACKNOWLEDGMENTS

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SECTION 1 - INTRODUCTION

Objective of the review

This review provides a summary of sites studied for the QDPI project GUNSYNpD and published information on pasture production in Queensland. As such the review serves as a working document for the GUNSYNpD project. Pasture production data from the sites listed are suitable for the calibration and/or validation of the pasture growth model GRASP (Appendix 2 of Final Report DAQ-124A).

Scope of the review.

The review aims to identify and document the location and description of sites where regular pasture growth measurements have been made. The review concentrates on pasture growth studies in Queensland, especially those which are representative of broad pasture communities. For this reason emphasis is placed on native pasture production data. However where sown species constitute major components of broad vegetation types such data is given equal emphasis as that of native pastures. This is often the case where sowing has followed broad scale land clearing (e.g. in brigalow, gidgee and rainforest communities).

Included in an annotated bibliography are sown pasture production studies, known pasture production studies from other states and other studies which provide associated data on soils, pastures or livestock production. This bibliography is not exhaustive and additions are encouraged. It is envisaged that this bibliography will become “active” on a new web site for NAGSNET (North Australia Grazing Systems Network) group. Once constructed this web site will be linked to the Long Paddock web site: http://www.dpi.qld.gov.au/longpdk
SECTION 2 - CLASSIFICATION OF QUEENSLAND PASTURES

The GUNSYNpD project aimed to document pasture growth for a wide range of soil, species, seasonal conditions and climatic regimes. The need to extrapolate from point scale measurements to statewide scales poses many problems which are currently being addressed. Pasture/soil classification are a framework to extrapolate point scale studies. The following is a brief review of statewide classifications of soils and vegetation. We formulate a preliminary rationale for classifying individual sites.

Soil Associations and Vegetation Zones.

Approximately 250 soil principle profile forms (PPF's: Northcote 1965) recognised in Queensland. PPF's have been amalgamated into soil associations and mapped for Australia (Atlas of Australian Soils map sheets). Weston et al. (1981) suggest that PPF's may be amalgamated into 5 soil texture groups which give "greater affinity to plant production". Similar soil texture groups have been recognised in other studies e.g. Tothill and Gillies (1993) and Thompson (1991).

Thirty-five vegetation zones have been previously recognised for Queensland (Premiers Department 1976, Weston et al. (1981). Weston et al. (1981) and Weston and Harbison (1980) have amalgamated these 35 vegetation zones into 14 pasture communities (Plate 1). More recently Tothill and Gillies (1993) have split the original 35 pasture zones into 46 local pasture units (LPU's) for Queensland and 151 LPU's for Northern Australia. The relationship between the above classifications is presented in Table 2.1.
### Table 2.1: Native pasture communities of Queensland

<table>
<thead>
<tr>
<th>PASTURE COMMUNITY</th>
<th>VEGETATION ZONE</th>
<th>REFERENCE No.</th>
<th></th>
<th></th>
<th></th>
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<td>Rainforest</td>
<td>A</td>
<td>1</td>
<td>1</td>
<td>25</td>
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<tr>
<td></td>
<td>Littoral</td>
<td>B</td>
<td>2</td>
<td>2</td>
<td>129</td>
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<tr>
<td></td>
<td>Heath</td>
<td>C</td>
<td>3</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Blady grass (sandy coastal lowlands)</td>
<td>Northern</td>
<td>D</td>
<td>2</td>
<td>4</td>
<td>27a</td>
</tr>
<tr>
<td></td>
<td>Central</td>
<td></td>
<td>2</td>
<td>4/5</td>
<td>4/5</td>
</tr>
<tr>
<td></td>
<td>Southern</td>
<td></td>
<td>5</td>
<td>5</td>
<td>27c</td>
</tr>
<tr>
<td>Black spear grass (coastal and subcoastal hills and mountains)</td>
<td>Northern (Bowen and North)</td>
<td></td>
<td>3</td>
<td>6</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Central (Proserpine-Callsiepe)</td>
<td></td>
<td>6</td>
<td>6</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Southern (Murrum Vale and South)</td>
<td></td>
<td>5</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Queensland blue grass</td>
<td>Central Queensland</td>
<td></td>
<td>4</td>
<td>27</td>
<td>27</td>
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<td>Southern Queensland</td>
<td></td>
<td>4</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Brigalow</td>
<td>Northern</td>
<td></td>
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<td>16</td>
<td>16</td>
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<tr>
<td></td>
<td>Roma region</td>
<td></td>
<td>5</td>
<td>16</td>
<td>16</td>
</tr>
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<td>5</td>
<td>16</td>
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</tr>
<tr>
<td></td>
<td>Belah</td>
<td></td>
<td>24</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Aristida-Bothriochloa</td>
<td>Aristida-Chrysopogon</td>
<td></td>
<td>6d</td>
<td>9</td>
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<tr>
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<td>West slopes Einasleigh uplands</td>
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<td>26</td>
<td>26</td>
<td>42</td>
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<tr>
<td></td>
<td>Paper-barked tea tree</td>
<td></td>
<td>6e</td>
<td>22</td>
<td>22</td>
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<tr>
<td></td>
<td>Aristida-Tridia (Lancewood)</td>
<td></td>
<td>6f</td>
<td>11</td>
<td>11</td>
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<tr>
<td></td>
<td>Aristida-Cleistochloia (Dissected sandstone hills)</td>
<td></td>
<td>6l</td>
<td>25</td>
<td>25</td>
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<tr>
<td></td>
<td>Aristida-Eragrostis</td>
<td></td>
<td>12</td>
<td>12</td>
<td>ss</td>
</tr>
<tr>
<td></td>
<td>Southern sandy country</td>
<td></td>
<td>6j</td>
<td>24</td>
<td>24</td>
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<tr>
<td></td>
<td>Both-Stipa-Danthonia (Granite Traprock)</td>
<td></td>
<td>6k</td>
<td>26</td>
<td>26</td>
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<td></td>
<td>Both-Chloris-Aris.-Erag. (semi-arid woodland plains and low hills)</td>
<td>Central Queensland</td>
<td>6h</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>South Queensland</td>
<td>6i</td>
<td>13</td>
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<tr>
<td></td>
<td>Aristida-Hyriolepis (Poplar box-mulga woodland)</td>
<td></td>
<td>6j</td>
<td>13/19</td>
<td>34</td>
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<td>Mulga</td>
<td>Soft and hard mulga pastures on red earth plains</td>
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<td>8m</td>
<td>19</td>
<td>19</td>
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<td>Mulga, bastard mulga on dissected residuals</td>
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<td>8n</td>
<td>20</td>
<td>20</td>
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<tr>
<td></td>
<td>Mulga, whitewood</td>
<td></td>
<td>8o</td>
<td>21</td>
<td>21</td>
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<td></td>
<td></td>
<td></td>
<td>8p</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Gidgee</td>
<td>Central</td>
<td></td>
<td>7k</td>
<td>17</td>
<td>17</td>
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<td></td>
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<td></td>
<td>7m</td>
<td>19</td>
<td>19</td>
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<tr>
<td></td>
<td>Georgina gidgee</td>
<td></td>
<td>7n</td>
<td>20</td>
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<tr>
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<td>Rolling downs</td>
<td></td>
<td>9p</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Stony downs</td>
<td></td>
<td>9q</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Ashy downs</td>
<td></td>
<td>9r</td>
<td>32</td>
<td>32</td>
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<tr>
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<td>Flooded alluvial plains (southern)</td>
<td></td>
<td>9s</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Flooded alluvial plains (northern)</td>
<td></td>
<td>10u</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Tropical plains and low hills</td>
<td></td>
<td>10v</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Schizachrium</td>
<td></td>
<td></td>
<td>10w</td>
<td>35</td>
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<td></td>
<td>Plume sorghum</td>
<td></td>
<td>10x</td>
<td>40</td>
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<td>Native sorghum</td>
<td></td>
<td></td>
<td>10y</td>
<td>45</td>
<td>45</td>
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<tr>
<td>Spinifex</td>
<td>Central Queensland &quot;desert&quot; country (soft spinifex)</td>
<td></td>
<td>10a</td>
<td>10</td>
<td>10</td>
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<tr>
<td></td>
<td>North-west Queensland soft spinifex (Mt. Isa highlands)</td>
<td></td>
<td>10b</td>
<td>15</td>
<td>15</td>
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<tr>
<td></td>
<td>Western Queensland hard spinifex</td>
<td></td>
<td>10c</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>mixed acacias and eucalypts</td>
<td></td>
<td>10d</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>spinifex (on dune fields)</td>
<td></td>
<td>10e</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Blue grass-Browntop</td>
<td>Tropical blue grass-browntop</td>
<td></td>
<td>12f</td>
<td>28</td>
<td>28</td>
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<tr>
<td></td>
<td>South-western gulf plains (ribbongrass: chrysopogon/other species)</td>
<td></td>
<td>12g</td>
<td>29</td>
<td>29</td>
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<tr>
<td>Channel pastures</td>
<td>Riverine pastures</td>
<td></td>
<td>11h</td>
<td>33</td>
<td>33</td>
</tr>
</tbody>
</table>

Notes: Reference No. indicates classifications from the following sources: (A) Weston and Harbison (1980); (B) Queensland Resource Atlas (1976); (C) Weston et al. (1981); (D) Tothill and Gillies (1991)
Indicated relationships between (A) and (B) are a guide only.
Appendix 4: Review of Pasture Production Data in Queensland

Replace with native pasture community map
Pasture Classification Adopted.

We have adopted the classification scheme of Tothill and Gillies (1993) for the following reasons:

1) the scheme is the most detailed for Queensland and can be translated to other, less detailed, schemes (Table 2.1);
2) the scheme is applicable across northern Australia.
3) the scheme is combined with the most recent assessment of pasture condition in northern Australia.
4) information is widely available for this scheme and other classifications described e.g. soil profile analyses (QDPI databases), land use, land capability, stock numbers and carrying capacity.

Each pasture community may contain a range of soil associations and pastures of different species composition and condition. Although, in this review, we have listed the pasture community, dominant PPF and dominant species for site, we have not attempted to define a potential matrix of pasture community x soil x pasture condition for Queensland. As such, care should be taken to evaluate how representative of a particular pasture community a given site is.

References


Weston, E.J. and Harbison J. (1980). Native pasture communities (map) and assessment of the agricultural and pastoral potential of Queensland. QDPI Ag. Branch.

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SECTION 3 - INVENTORY OF SITES

Introduction

The pasture production model GRASP requires input of (1) soil descriptions, in particular, with respect to plant available water capacity (PAWC) and (2) descriptions of production potential based on species and fertility factors, in particular, water-use-efficiency, potential nitrogen uptake and plant basal area. Field studies have generally been conducted on a point scale (small exclosures) over a seasonal time span (Appendix 3 of Final Report DAQ-124A). Sites are tabulated in this section where field studies provide pasture production data in an appropriate form for model calibration or validation. The following site attributes are listed in subsequent tables:

1) pasture community as described by Tothill and Gillies (1991) (Table 2.1);
2) the dominant one or two pasture species (or genera) (Table 3.1);
3) soil profile description in terms of the principle profile form (PPF) (Northcote 1965);
4) latitude and longitude;
5) period of observations; and
6) and treatments imposed.

Time-series graphs of observed and simulated soil water (0-10cm, 0-50cm and total profile), green cover, total standing biomass and nitrogen yield are presented for sites for which the GRASP model has been calibrated.

For convenience sites are grouped according to the pasture communities of Weston and Harbison 1980 (Table 2.1 and subsequent colour plates in this section). An exception is the speargrass zone which, due to the large number of sites, is broken into Tothill and Gillies (1993) southern, central and northern zones. Data is presented separately for each community.
Table 3.1: Species abbreviations for subsequent tables in this section

<table>
<thead>
<tr>
<th>Code</th>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ar ..</td>
<td>Aristida spp.</td>
<td>wiregrass / white spear grass</td>
</tr>
<tr>
<td>As ..</td>
<td>Astrebla spp.</td>
<td>mitchell grass</td>
</tr>
<tr>
<td>Bb ..</td>
<td>Bothriochloa bladhii</td>
<td>forest blue grass</td>
</tr>
<tr>
<td>Bd ..</td>
<td>Bothriochloa decipiens</td>
<td>pitted blue grass</td>
</tr>
<tr>
<td>Be ..</td>
<td>Bothriochloa ewartiana</td>
<td>forest blue grass</td>
</tr>
<tr>
<td>Bp ..</td>
<td>Bothriochloa pertusa</td>
<td>Indian cooch</td>
</tr>
<tr>
<td>Cc ..</td>
<td>Cenchrus ciliaris</td>
<td>buffel grass</td>
</tr>
<tr>
<td>Cf ..</td>
<td>Chrysopogon fallax</td>
<td>golden-beard grass</td>
</tr>
<tr>
<td>Cg R.</td>
<td>Chloris Gayana var. Callide</td>
<td>Callide rhodes grass</td>
</tr>
<tr>
<td>Da ..</td>
<td>Dichanthium aristatum</td>
<td>angleton grass</td>
</tr>
<tr>
<td>Dd ..</td>
<td>Digitaria didactyla</td>
<td>blue cooch</td>
</tr>
<tr>
<td>Df ..</td>
<td>Dicanthium fecundum</td>
<td>blue grass</td>
</tr>
<tr>
<td>Ds ..</td>
<td>Dicanthium sericeum</td>
<td>Queensland blue grass</td>
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<tr>
<td>Dsa.</td>
<td>Dicanthium sericium ssp. affine</td>
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</tr>
<tr>
<td>Ef ..</td>
<td>Eulalia fulva</td>
<td>brown-top</td>
</tr>
<tr>
<td>En ..</td>
<td>Emesapgon spp.</td>
<td>bottle-washer grass</td>
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<td>Hc ..</td>
<td>Heteropogon contortus</td>
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<tr>
<td>Lp ..</td>
<td>Lablab purpureus</td>
<td>lablab bean</td>
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<td>Mp ..</td>
<td>Monacather paradoxa</td>
<td>mulga oats grass</td>
</tr>
<tr>
<td>Pc ..</td>
<td>Pennisetum clandestinum</td>
<td>kikuyu</td>
</tr>
<tr>
<td>Sh ..</td>
<td>Stylosanthes humilis</td>
<td>Townsville stylos</td>
</tr>
<tr>
<td>Si ..</td>
<td>Setaria incrassata</td>
<td>purple pigeon grass</td>
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<td>Tm ..</td>
<td>Thyridolepis mitchelliana</td>
<td>mulga mitchell grass</td>
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<tr>
<td>Tr ..</td>
<td>Triodia mitchelli</td>
<td>spinifex</td>
</tr>
<tr>
<td>Tt ..</td>
<td>Themeda triandra</td>
<td>kangaroo grass</td>
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</table>
The following pages of section 3 heading are to be removed and are only to produce table of contents.
Southern speargrass

Unpublished data

References

Time-series of observed and simulated data

Central speargrass

Unpublished data

References

Time-series of observed and simulated data

Northern speargrass

Unpublished data

References

Time-series of observed and simulated data

Queensland bluegrass

Unpublished data

Time-series of observed and simulated data

Brigalow

Unpublished data

References
Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland

Time-series of observed and simulated data

Gidgee pastures

Unpublished data

Time-series of observed and simulated data

Sown pasture sites other than brigalow or gidgee

Unpublished data

Time-series of observed and simulated data

Mulga pastures

Unpublished data

References

Time-series of observed and simulated data

Aristida-Bothriochloa pastures

Unpublished data

References

Time-series of observed and simulated data

Mitchell grass pastures

Unpublished data

References

Time-series of observed and simulated data

Spinifex pastures

Unpublished data
References

Time-series of observed and simulated data

Bluegrass-browntop pastures

Unpublished data

References

Time-series of observed and simulated data

Pastures sparse or absent: rainforest and heathland

Unpublished data

Native Sorghum

References

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Appendix 4: Review of Pasture Production Data in Queensland
Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland

Appendix 4: Review of Pasture Production Data in Queensland

Page replaced with speargrass pasture map
### SOUTHERN SPEAR Grass

**NATIVE PASTURE PRODUCTION SITES**

<table>
<thead>
<tr>
<th>Officer</th>
<th>Location</th>
<th>Soil</th>
<th>Species</th>
<th>Years</th>
<th>Footnote</th>
</tr>
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<tbody>
<tr>
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<td>Lat. Long.</td>
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<tr>
<td>Day</td>
<td>30 Brian Pastures &quot;Ron&quot;</td>
<td>25°39.9'S 151°45.1'E</td>
<td>Ug5.12</td>
<td>Hc, Bb</td>
<td>87-95</td>
</tr>
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<td>Day</td>
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<td>25°40.3'S 151°45.4'E</td>
<td>Uf6.322</td>
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<td>87-95</td>
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<tr>
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<tr>
<td>Day</td>
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<td>McKeon</td>
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<td>McKeon</td>
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<td>Hc</td>
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<td>Bronte</td>
<td>30 Brian Pastures &quot;TEK&quot;</td>
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<td>Day</td>
<td>30 Branch Ck. &quot;Hill&quot;</td>
<td>25°25.7'S 151°27.0'E</td>
<td>Gm3.22</td>
<td>Bd, Hc</td>
<td>91-92</td>
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<td>Day</td>
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<tr>
<td>Day</td>
<td>30 Elystan &quot;Fl&quot;</td>
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<td>Db1.11</td>
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<tr>
<td>Day</td>
<td>30 Elystan &quot;Me&quot;</td>
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<td>Hc</td>
<td>91-92</td>
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<td>Day</td>
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<tr>
<td>Mott/Day</td>
<td>30 Narayen</td>
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<td>87-88</td>
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<td>Mott/Day</td>
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<td>Hc</td>
<td>87-88</td>
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<td>Filet (1990)</td>
<td>30 Narayen</td>
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<td>Henzell et al. (1975)</td>
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<td>25°42.5'S 150°53.3'E</td>
<td>Dy3.41</td>
<td>Hc, Bc</td>
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<td>Day</td>
<td>30 Crowns Nest/Blackbut</td>
<td>27°02.0'S 152°01.0'E</td>
<td>Dy</td>
<td>Hc, Bd</td>
<td>93-95</td>
</tr>
<tr>
<td>Crosthwaite</td>
<td>30 Warragai</td>
<td>26°33.3'S 151°24.9'E</td>
<td>D</td>
<td>Bd</td>
<td>92-94</td>
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<tr>
<td>Rickert</td>
<td>30 Lawes Ag. College</td>
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<td>Ug5.1</td>
<td>Da</td>
<td>87-88</td>
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<tr>
<td>Malcolmson</td>
<td>30 Coal Ck. via Esk</td>
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<td>Dy3.41</td>
<td>Hc</td>
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<tr>
<td>Malcolmson</td>
<td>30 Old Hidden Vale</td>
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<td>Dy</td>
<td>Dd, Hc</td>
<td>91-95</td>
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</tbody>
</table>

1: 5xN x +PSK
2: +irrigration x N alone, P alone, N+P, no fertiliser.
3: +- burnt, +- siratro & P
4: 2 species x various nutrient treatments, grazed and ungrazed pretreatments.
5: 3 patches: speargrass, chrysopogon and aristida
6,7: +- trees
8: trees (2 densities), cleared (+- prior grazing)
Southern speargrass references


Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland

CENTRAL SPEAR GRASS
NATIVE PASTURE PRODUCTION SITES

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<thead>
<tr>
<th>Officer</th>
<th>Location</th>
<th>Lat/Long</th>
<th>Soil</th>
<th>Speci es</th>
<th>Years</th>
<th>Footnote</th>
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<td>Anderson</td>
<td>Parkhurst</td>
<td>23°17.8'S 150°30.5'E</td>
<td>Dy2.42</td>
<td>Be, Hc</td>
<td>87</td>
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<tr>
<td>Back R'ford</td>
<td>Galloway Plains &quot;East&quot;</td>
<td>24°10.1'S 150°57.1'E</td>
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<td>Hc</td>
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<tr>
<td>Back R'ford</td>
<td>Galloway Plains &quot;West&quot;</td>
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<td>Dy 3.13</td>
<td>Be</td>
<td>89-95</td>
<td>-</td>
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<tr>
<td>Back R'ford</td>
<td>Galloway Plains &quot;Alluv&quot;</td>
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<td>92-95</td>
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<tr>
<td>Shaw &amp; Bisset (1954)</td>
<td>Calliope Station</td>
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<tr>
<td>'t Mannetje (1972)</td>
<td>Rodd's Bay</td>
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<td>Dg1.43</td>
<td>Hc</td>
<td>61-65</td>
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<td>Miles (1949)</td>
<td>Fitzroyvale</td>
<td>23°27'S 150°45'E</td>
<td>Hc</td>
<td>40-46</td>
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</tbody>
</table>

1: grazed & ungrazed
2: Paspalum (sown) & speargrass, 5 x N.
3: various cutting times, frequencies. Cutting frequency pretreatment, grazed & ungrazed

Central speargrass references


### Northern Speargrass

#### Native Pasture Production Sites

<table>
<thead>
<tr>
<th>Officer</th>
<th>Property/Site</th>
<th>Location</th>
<th>Soil</th>
<th>Species</th>
<th>Year(s)</th>
<th>Footnote</th>
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<tbody>
<tr>
<td>Pressland et al. (draft)</td>
<td>Ida Ck (Bowen)</td>
<td>20°16.5'S 148°07.3'E</td>
<td>Dy</td>
<td>Bp</td>
<td>85-86</td>
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<tr>
<td></td>
<td>Swan's Lagoon</td>
<td>20°03.7'S 147°14.6'E</td>
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<td>Hc</td>
<td>85-86</td>
<td>2</td>
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<tr>
<td>McCaskill</td>
<td>Lansdown &quot;speargrass&quot;</td>
<td>19°39.0'S 146°50.0'E</td>
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<td>Hc</td>
<td>88-89</td>
<td>-</td>
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<tr>
<td>McCaskill</td>
<td>Lansdown &quot;pertusa&quot;</td>
<td>19°37.8'S 146°49.3'E</td>
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<td>McCown et al. (1974)</td>
<td>Lansdown</td>
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<td>Cc</td>
<td>64-68</td>
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<td>McIvor (1981)</td>
<td>Lansdown</td>
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<td>Gn3.15</td>
<td>Hc,Sh</td>
<td>66-68,71</td>
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<td>Bp</td>
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<td>McCaskill</td>
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<td>Bp</td>
<td>89</td>
<td>-</td>
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<tr>
<td>Miller</td>
<td>Meadowbank</td>
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<td>89</td>
<td>-</td>
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<tr>
<td>Miller</td>
<td>Springmount</td>
<td>17°14'S 145°18'E</td>
<td>Dr2.22</td>
<td>Tt</td>
<td>82-88</td>
<td>-</td>
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<tr>
<td>Punter</td>
<td>Springmount</td>
<td>17°13.9'S 145°17.9'E</td>
<td>Dr2.22</td>
<td>Tt</td>
<td>87</td>
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</tbody>
</table>

1: burnt & unburnt pretreatments  
2: +- seca and verano stylo pretreatments  
3: Buffel, miscellaneous nutrients, +-N  
4: Unburnt in second year

### Northern speargrass references


Pressland, A.J., Myles, D.J. and Chaplain, N.P. (draft). Production from an invading *Bothriochloa pertusa* pasture compared with that from the native *Heteropogon contortus* in coastal Queensland.
Page replaced with Brigalow, Belah, Qld Blue grass map
# QUEENSLAND BLUE GRASS
## NATIVE PASTURE PRODUCTION SITES

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<th>Species</th>
<th>Years</th>
<th>Footnote</th>
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<tbody>
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<td>Jacobsen</td>
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<td>Conway</td>
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1: +- N
2: +- N

# BRIGALOW
## PASTURE PRODUCTION SITES

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<th>Species</th>
<th>Year</th>
<th>Footnote</th>
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<tr>
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<td>&quot;Kalarah&quot;</td>
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<td>24°48.9'S 149°45.6'E</td>
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<td>Clem/Conway</td>
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Brigalow references


Page replaced with Gidgee, Mulga, Channel pastures
Appendix 4: Review of Pasture Production Data in Queensland
GIDGEE PASTURES
NATIVE PASTURE PRODUCTION SITES

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<th>Years</th>
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<tr>
<td>Phelps</td>
<td>Coolagh (Blackall)</td>
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<td>Chippendale (Blackall)</td>
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<td>Cc</td>
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<tr>
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<td>Norwood (Blackall)</td>
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SOWN PASTURE PRODUCTION SITES (other than brigalow or gidgee)

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<td>Willcocks</td>
<td>Inderi (Rolleston)</td>
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## MULGA PASTURES
### NATIVE PASTURE PRODUCTION SITES

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<th>Years</th>
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<td>Hodgkinson/Ludwig</td>
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<td>Turn Turn</td>
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<td>Tm</td>
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<td>89-90</td>
<td>-</td>
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<td>DPI Reserve Charleville</td>
<td>Gn2.12a</td>
<td>Tm</td>
<td>87</td>
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<td>Charleville airport</td>
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<td>Pressland &amp; Lehane (1980)</td>
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<td>-</td>
</tr>
<tr>
<td>Beale (1973)</td>
<td>Monamby</td>
<td>Gn2.12a</td>
<td>Tm,Ar</td>
<td>66-71</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Boatman</td>
<td>Gn2.12a</td>
<td>Tm,Ar</td>
<td>66-71</td>
<td></td>
</tr>
</tbody>
</table>

- hard
- soft
1: exclosed and grazed
2: various initial grass basal areas (one harvest per year)
3: 4 tree densities

### Mulga references


Appendix 4: Review of Pasture Production Data in Queensland

Page replaced with Aristida-Bothriochloa Map
### ARISTIDA BOTHRIOCHLOA PASTURES
### NATIVE PASTURE PRODUCTION SITES

<table>
<thead>
<tr>
<th>Officer</th>
<th>Property/Site</th>
<th>Soil Type</th>
<th>Species</th>
<th>Years</th>
<th>Footnote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hall/Punter</td>
<td>Euthulla &quot;aristida&quot;</td>
<td>solodic</td>
<td>Ar,Cc</td>
<td>93-95</td>
<td></td>
</tr>
<tr>
<td>Hall/Punter</td>
<td>Euthulla &quot;buffel&quot;</td>
<td>solodic</td>
<td>Cs</td>
<td>93-95</td>
<td></td>
</tr>
<tr>
<td>Hall/Punter</td>
<td>Euthulla &quot;blue grass&quot;</td>
<td>solodic</td>
<td>Ds</td>
<td>93-95</td>
<td></td>
</tr>
<tr>
<td>Hall/Punter</td>
<td>Roselea &quot;aristida&quot;</td>
<td>red earth</td>
<td>Ar</td>
<td>93-95</td>
<td></td>
</tr>
<tr>
<td>Hall/Punter</td>
<td>Roselea &quot;buffel&quot;</td>
<td>solodic</td>
<td>Cs</td>
<td>93-95</td>
<td></td>
</tr>
<tr>
<td>Hall/Punter</td>
<td>Banoona &quot;bluegrass&quot;</td>
<td>Dsa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filet/Osten</td>
<td>Keilameite</td>
<td>Be Hc</td>
<td></td>
<td>93-94</td>
<td></td>
</tr>
<tr>
<td>Filet/Osten</td>
<td>Kilmarnock</td>
<td>He</td>
<td></td>
<td>93-94</td>
<td></td>
</tr>
<tr>
<td>Filet/Osten</td>
<td>Oak Park</td>
<td>Cf</td>
<td></td>
<td>93-94</td>
<td></td>
</tr>
<tr>
<td>Wilcocks/Filet</td>
<td>Springvale &quot;Fred&quot;</td>
<td>Dy2.4</td>
<td>Be</td>
<td>91-92</td>
<td></td>
</tr>
<tr>
<td>Wilcocks/Filet</td>
<td>Rubyvale &quot;2&quot;</td>
<td>Dr2</td>
<td>Ts,Hc</td>
<td>91-92</td>
<td></td>
</tr>
<tr>
<td>Wilcocks/Filet</td>
<td>Rubyvale &quot;1&quot;</td>
<td>Dr2</td>
<td>Bb,Be</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>Back</td>
<td>Wandabah (Dingo)</td>
<td>Dy3.4</td>
<td>Hc</td>
<td>88-92</td>
<td>1</td>
</tr>
<tr>
<td>Anderson</td>
<td>Epping Forest N.P.</td>
<td>Uc1.2</td>
<td>En,Ar</td>
<td>88-89</td>
<td>2</td>
</tr>
</tbody>
</table>

1: cleared and 2 tree densities
2: burnt,mown

### Aristida-Bothriochloa references


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Appendix 4: Review of Pasture Production Data in Queensland
Page replaced with Mitchell grass map
## MITCHELL GRASS PASTURES
### NATIVE PASTURE PRODUCTION SITES

<table>
<thead>
<tr>
<th>Officer</th>
<th>Property/Site</th>
<th>Lat Long</th>
<th>Soil</th>
<th>Species</th>
<th>Years</th>
<th>Footnote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carter rdn</td>
<td>Toorak (Julia Ck.)</td>
<td>20°58.6'S 141°48.1'E</td>
<td>Ug5.34</td>
<td>As</td>
<td>87</td>
<td>1</td>
</tr>
<tr>
<td>Carter rdn</td>
<td>Rosebank (Longreach)</td>
<td>23°33.9'S 144°13.4'E</td>
<td>Ug5.34</td>
<td>As</td>
<td>89</td>
<td>-</td>
</tr>
<tr>
<td>Johnston rds</td>
<td>Biddenham (Augathella)</td>
<td>25°43.4'S 146°24.3'E</td>
<td>Ug5.22</td>
<td>As</td>
<td>87</td>
<td>-</td>
</tr>
<tr>
<td>Johnston rds</td>
<td>Airlie (Wyandra)</td>
<td>27°21.1'S 146°00.2'E</td>
<td>Ug5.25</td>
<td>As</td>
<td>89,90</td>
<td>-</td>
</tr>
<tr>
<td>Hall rds</td>
<td>Roma Res Station</td>
<td>26°34.9'S 148°46.0'E</td>
<td>Ug5.3</td>
<td>As</td>
<td>92</td>
<td>2</td>
</tr>
<tr>
<td>Scanlan (1980) rdn</td>
<td>Toorak (Julia Ck.)</td>
<td>20°58.6'S 141°48.1'E</td>
<td>Ug5.34</td>
<td>As</td>
<td>77</td>
<td>3</td>
</tr>
<tr>
<td>Christie (1981) rds</td>
<td>20km W Charleville</td>
<td>26°25'S 146°04'E</td>
<td>Ug5.22</td>
<td>As,Ds</td>
<td>76</td>
<td>-</td>
</tr>
<tr>
<td>Christie (1981) rds</td>
<td>Burenda (Augathella)</td>
<td>25°44.3'S 146°48.2'E</td>
<td>Ug5.22</td>
<td>As,Ds</td>
<td>74-77</td>
<td>4</td>
</tr>
<tr>
<td>Hall and Lee (1980) rdn</td>
<td>Toorak (Julia Ck.)</td>
<td>20°58.6'S 141°48.1'E</td>
<td>Ug5.34</td>
<td>As</td>
<td>76-78</td>
<td>5</td>
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<tr>
<td>Davies et al. (1938) rdn</td>
<td>Elderslie (Winton)</td>
<td>22°17'S 142°28'E</td>
<td>Ug5.34</td>
<td>As</td>
<td>35,36</td>
<td>6</td>
</tr>
<tr>
<td>Roe &amp; Allen (1945) Roe (1962) Allen (1963) rds</td>
<td>Gilruth Plains (Cunnamulla)</td>
<td>28°07.0'S 145°57.9'E</td>
<td>Ug5.25</td>
<td>As</td>
<td>41-44, 61</td>
<td>7</td>
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<tr>
<td>Hullett (unpublished) rds</td>
<td>Ward Plain (Charleville)</td>
<td>26°20.7'S 146°06.4'E</td>
<td>Ug5.25</td>
<td>As</td>
<td>70</td>
<td>-</td>
</tr>
<tr>
<td>Launders (1980) Northern N.S.W.</td>
<td>Avon Downs (Burren Junction)</td>
<td>30°00.0'S 148°59'E</td>
<td>Ug5.25</td>
<td>As</td>
<td>69,70</td>
<td>8</td>
</tr>
<tr>
<td>Launders (1980) Northern N.S.W.</td>
<td>Warrambool (Burren Junction)</td>
<td>30°13.0'S 149°05'E</td>
<td>Ug5.25</td>
<td>As</td>
<td>69,70</td>
<td>8</td>
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<tr>
<td>Launders (1980) Northern N.S.W.</td>
<td>Gnomery (Burren Junction)</td>
<td>30°10.0'S 148°56'E</td>
<td>Ug5.25</td>
<td>As</td>
<td>69,70</td>
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<tr>
<td>Launders (1980) Northern N.S.W.</td>
<td>Rothesay (Burren Junction)</td>
<td>30°06.0'S 148°56'E</td>
<td>Ug5.25</td>
<td>As</td>
<td>69,70</td>
<td>8</td>
</tr>
</tbody>
</table>

1: N 2: +, N 3: +, N, + irrigation, + slashing 4: 1 harvest per year 5: exclosed, grazed 6: three stocking rates x continuous, rotational grazing (spelling gives primary production)

### Mitchell grass references


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**Appendix 4: Review of Pasture Production Data in Queensland**


Page replaced with Spinifex map
### SPINIFEX
### NATIVE PASTURE PRODUCTION SITES

<table>
<thead>
<tr>
<th>Officer</th>
<th>Comm</th>
<th>Property/site</th>
<th>Lat Long</th>
<th>Soil</th>
<th>Species</th>
<th>Years</th>
<th>Footnote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reynolds</td>
<td>102</td>
<td>Swanlea (L. Galilee)</td>
<td>22°18.7'S 145°38.2'E</td>
<td>Gn2.11</td>
<td>Tr</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Johnston</td>
<td>102</td>
<td>Wongalee (Charleville/Bollon)</td>
<td>27°12.8'S 146°37.4'E</td>
<td>Uc5.2</td>
<td>Tr</td>
<td>89,90</td>
<td></td>
</tr>
</tbody>
</table>

#### Spinifex references
Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland

Appendix 4: Review of Pasture Production Data in Queensland

Page replaced with Schizachrium, Blue grass Browntop Native Sorghum map
BLUE GRASS BROWNTOP
NATIVE PASTURE PRODUCTION SITES

<table>
<thead>
<tr>
<th>Officer</th>
<th>Location</th>
<th>Soil</th>
<th>N</th>
<th>Years</th>
<th>Footnote(TreeNode)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bishop (1977)</td>
<td>67 Milgarra</td>
<td>18°06.9'S 140°52.9'E</td>
<td>Ug5.25</td>
<td>As, Df, Ef</td>
<td>68-71</td>
</tr>
<tr>
<td>Scanlan</td>
<td>67 Milgarra</td>
<td>18°06.9'S 140°52.9'E</td>
<td>Ug5.25</td>
<td>As, Df, Ef</td>
<td>75-77</td>
</tr>
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</table>

1: 6xP, 4Px4n

Blue grass Browntop references


NATIVE SORGHUM

Native sorghum references


PASTURES SPARSE OR ABSENT

RAINFOREST
NATIVE PASTURE PRODUCTION SITES

<table>
<thead>
<tr>
<th>Officer</th>
<th>Location</th>
<th>Soil</th>
<th>Species</th>
<th>Years</th>
<th>Footnote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carter</td>
<td>Maleny</td>
<td>27°04.7'S 152°58.7'E</td>
<td>Kraznozem</td>
<td>92</td>
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</tr>
</tbody>
</table>

1: + N

HEATHLAND
NATIVE PASTURE PRODUCTION SITES

<table>
<thead>
<tr>
<th>Officer</th>
<th>Location</th>
<th>Soil</th>
<th>Species</th>
<th>Years</th>
<th>Footnote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carter</td>
<td>Caboolture (Wallum)</td>
<td>27°04.7'S 152°58.8'E</td>
<td>Dy3.11</td>
<td>91/92</td>
<td>-</td>
</tr>
<tr>
<td>Carter</td>
<td>Caboolture (Wallum)</td>
<td>27°04.6'S 152°58.8'E</td>
<td>Dy3.11</td>
<td>91/92</td>
<td>1</td>
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</tbody>
</table>

1: + trees
SECTION 4 - ANNOTATED BIBLIOGRAPHY

This section contains an annotated bibliography of published information associated with both sown and native pasture growth in Queensland and, less exhaustively, for northern Australia.

Published native pasture production


---

**Appendix 4: Review of Pasture Production Data in Queensland**


Pressland, A.J., Myles, D.J., and Chaplain, N.P. (draft). Production from an invading *Bothriochloa pertusa* pasture compared with that from the native *Heteropogon contortus* in coastal Queensland.


Other papers relevant to rangelands work


Sown pastures in the dry tropics


Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland


Sown pastures on the Atherton Tablelands


Sown pastures in the wet tropics


Appendix 4: Review of Pasture Production Data in Queensland
Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland

Sown pastures in coastal south-east Queensland (including dairy pastures)


Harris, H. (1973?). PhD. thesis, University of New England (Growth of kikuyu and several other grasses at Wollongbar, northern NSW, using a modelling framework)


Appendix 4: Review of Pasture Production Data in Queensland


Summer forage crops


Sown temperate pastures

Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland

Clarkson, N.M. (1986). Pasture species for the granite and traprock areas of south-east Queensland. Qld. J. Agric. Anim. Sci. 43, 147-157. (3-yr mean yields of various legumes are presented for 1 site)


**Forage oats**


Effects of grazing intensity on pasture condition


McIvor, J.G., and Williams, J. (in prep). A report on soil loss-runoff-cover relationships at Cardigan. (A version of this paper has been prepared by JMcl for JW's comments)


Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland

Management of the world's savannas" Ed. J.C. Tothill and J.J. Mott. (Basal area changes for grazed and ungrazed Astrebla near Cunnamulla, 1972-84)


Native pasture references in Northern Territory and Northern Western Australia

Annual Sorghum species in N.W. Australia

Sorghum intrans at Thorak (Darwin) Thorak 12 25 130 58 10km E Darwin


see also Norman (1963)

Sorghum stipoideum at Kununurra (W.A.)


Douglas Daly Experimental Station: LAMSAT project LWRRDC
Evaluating The Risk of Pasture and Land Degradation in Native Pastures in Queensland

Current Project: Land Management Strategies for the Semi Arid Tropics (LAMSAT) Project. LWRRDC. Contact: Mohammed Dilshad (CCNT), Mark Silburn (QDPI).


L.J. Peel, Dilshad M. and Motha J.A. (1995). Results from Swiftsynd trials on improved and native pastures at Douglas Daly, N.T. Technical Memorandum 95/2, Land Conservation Unit, Conservation Commission of the Northern Territory, Palmarston, N.T.

Victoria River District: Studies by B.D. Foran and G. Bastin


Victoria River District: Studies by R. Dyer and M. Cobiac

Current Project Meat Research Corporation NTA.022. Developing sustainable beef production systems for the semi-arid tropics of the Northern Territory.

Contact Mr. Rod Dyer - NT Dept of Primary Industry and Fisheries (Arid Zone Research Institute)


CSIRO Katherine Research Station: Studies by M.J.T Norman and E.L. Smith


E.L. Smith (1960). Effects of burning and clipping at various times during the wet season on tropical tallgrass range in northern Australia. J. Range Management 13(4), 197-203.

Appendix 4: Review of Pasture Production Data in Queensland

**Barkly Tableland: Study by B.D. Foran and G. Bastin**


**Central Australia: Studies (general)**


**Central Australia: Studies by M.H. Friedel**


**Central Australia: Study by M.A. Ross and C. Lendon**


*Central Australia: Studies by T.J. Hobbs and A.D. Sparrow*


*Maps of pasture types*

Shaw, K. and Bastin G. Land Systems and Pasture Types of the Southern Alice Springs District, Department of Primary Industry and Fisheries, Technical Bulletin No. 136.


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Appendix 4: Review of Pasture Production Data in Queensland