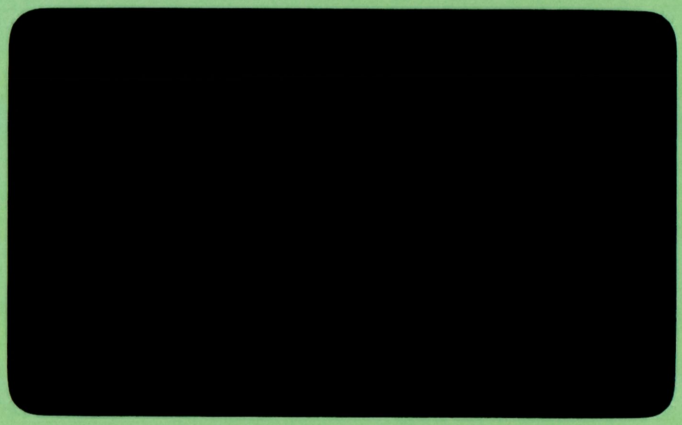
Genetic Resources Communication



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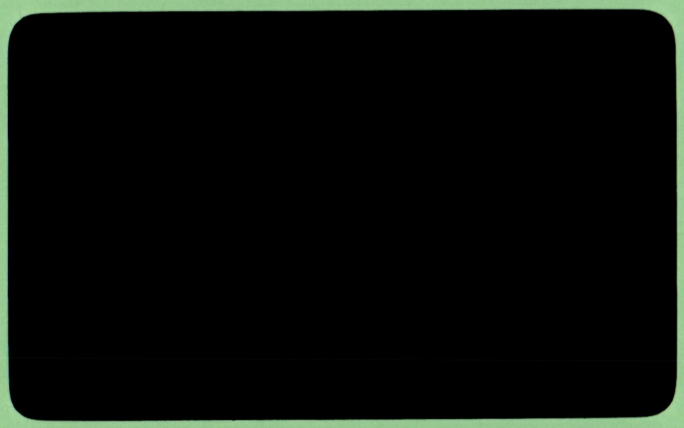

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THE PALATABILITY, FEEDING VALUE AND APPARENT TOXICITY OF 150 LEGUME SPECIES FED TO RATS

R.W. STRICKLAND[1], L.J. LAMBOURNE[1] AND D. RATCLIFF[2]

SUMMARY

The voluntary intake and liveweight gain of rats fed vegetative material of 340 accessions or seed of 110 accessions were compared with results from rats fed standard diets ad libitum and at restricted rates. Toxicity was distinguished from simple unpalatability by comparing the weight gain observed on test diets with the expected weight gain for that level of intake from the regression of weight gain on intake of the standard diets.

Only 40 of the 150 species fed to rats were both palatable and non toxic, though a further 19 species contained accessions with that description. The variation in palatability and toxicity within species was often as large as that between species.

1 CSIRO, Division of Tropical Crops and Pastures, Cunningham Laboratory, 306 Carmody Road, St. Lucia, Queensland 4067, Australia.

2 CSIRO, Division of Mathematics and Statistics, Cunningham Laboratory, 306 Carmody Road, St. Lucia, Queensland 4067, Australia.

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THE PALATABILITY, FEEDING VALUE AND APPARENT TOXICITY OF 150 LEGUME SPECIES FED TO RATS

R.W. STRICKLAND[1], L.J. LAMBOURNE[1] AND D. RATCLIFF[2]

[1] CSIRO, Division of Tropical Crops and Pastures, Cunningham Laboratory, 306 Carmody Road, St. Lucia, Queensland 4067, Australia.

[2] CSIRO, Division of Mathematics and Statistics, Cunningham Laboratory, 306 Carmody Road, St. Lucia, Queensland 4067, Australia.

INTRODUCTION

The genera Cassia, Crotalaria, Indigofera and Tephrosia contain species known to be toxic to domestic stock (Everist 1981; Watt and Breyer-Brandwijk 1962). They also contain agronomically desirable species adapted to environments similar to those of tropical and subtropical Australia, very few of which have been evaluated as forages through fear of toxicity.

The diversity of toxic chemical compounds occurring both within and between species of these genera (Watt and Breyer-Brandwijk 1962) renders routine chemical screening impractical, and feeding domestic animals in pens is logistically prohibitive for large numbers of accessions. We therefore developed a technique for rapid evaluation of palatability and apparent toxicity using rat bioassay and small amounts of dried forage or seed (Strickland et al. 1987).

This paper tabulates the results obtained when that technique was used to assess the palatability, feeding value and apparent toxicity of 390 forage diets representing 340 accessions in 150 species, and 110 seed diets representing 110 accessions in 60 species.

MATERIAL AND METHODS

The material fed to rats is listed in Tables 1 and 2. The former refers to diets of vegetative material (forage); the latter refers to seed diets.

The methodology, its derivation and validation have been covered in detail by Strickland et al. (1987). Briefly, several plants of each accession were grown in the field at the CSIRO Cooper Laboratory, Gatton or the CSIRO Pasture Research Station, Beerwah, depending on the soil type from which they originated. In a few cases, plants were grown in pots at the CSIRO Pasture Research Station, Samford.

Dried and ground vegetative material was analysed for nitrogen and neutral detergent fibre content and incorporated as 20% of a basal casein/starch/cellulose diet, which was adjusted to allow for the protein and fibre content of the added test material. Seed material was incorporated as 5% of the basal diet, which was adjusted for average protein and fibre content of seed based on samples from 30 representative species. Vegetative feeds were compared with lucerne hay; seed feeds were compared with autoclaved soybean seed. All feeds were fed ad libitum for

20 days unless acute toxicity effects became apparent sooner, and control feeds were also fed at two or three levels of restriction to assess the effect of intake on growth rate.

Weanling Wistar rats from the Central Animal Breeding House, University of Queensland, were housed in plastic cages with stainless steel grid floors in an ambient temperature of 21–22°C and 12 hour days. They were allocated into initial body weight groups and assigned four to a cage at random within weight classes. All cages had the same weight range. Each feed was fed to two cages of rats which were weighed at the start of each trial and every 3–4 days thereafter to measure rate of weight gain. Intake was calculated from weight of feed given, left and spilled, and mean digestibility was estimated from the concentration in a bulked faecal sample of the chromium oxide included at 0.4% in the pelletted diet.

STATISTICAL METHODS

Forage evaluation. Quadratic regressions of live weight gain on intake were fitted to the data for the controls and tested for parallelism over batches (runs). The coefficients of the linear and quadratic terms were homogeneous but the intercepts differed between batches, due possibly to differences in the mean initial weight of the batch (48–87 g). Thus parallel curves were used with different intercepts for each batch.

Deviations of the test feeds from the regression fitted to the control observations were calculated and an analysis of variance was performed on these deviations.

Seed data. Linear regressions of weight gain on intake were fitted to the data for the controls and tested for parallelism over batches. The regressions were parallel but differed in intercept over batches. The data were then analysed as for the forage data.

Palatability, toxicity and feeding value

A species was deemed to be unpalatable if rats consumed significantly less of it than of the control diet, but gained weight at the rate expected for that intake (from regression of liveweight gain (LWG) on dry matter intake (DDMI or DMI) of the controls). If the observed LWG was significantly less than the expected LWG for that level of intake, the species was provisionally deemed to be toxic. The regression of LWG on DDMI for the lucerne forage controls indicated that the maintenance level of this diet was 2.75 g/day. Intakes below this necessarily resulted in weight loss even in non toxic species. Feeding value was defined as LWG/DDMI.

RESULTS

Plant composition, liveweight gain, intake, feeding value (weight gain per gram of food eaten) and the difference between observed and expected weight gain (deviation of test feed from control curve) for vegetative feeds are given in Table 1. Seed feeds (Table 2) were not analysed for nitrogen and fibre content. Intake is expressed as digestible dry matter intake (DDMI) in Table 1 and dry matter intake (DMI) in Table 2. In the work cited earlier, we showed that dry matter intake and digestible dry matter intake were equally correlated with weight gain for vegetative feeds containing 20% legume. There seemed little point in estimating digestibility for seed feeds containing only 5% legume.

DISCUSSION

The main determinant of weight gain was intake (Strickland et al. 1987). Rats gained weight on any feed they were prepared to eat in reasonable quantity. Clearly, feeds which were eaten freely and sustained rapid weight gains without visible pathological manifestations were both palatable and non toxic.

Most of the low weight gains in Tables 1 and 2 were associated with low intake due to unpalatability as the observed gains did not differ significantly from the expected weight gain for that intake. Where the observed weight gains did differ significantly from expected values, it is highly probable that some form of toxicity was involved. Toxic species are not necessarily unpalatable (compare Cassia alata 28535 and Cassia mimosoides 60178 in Table 1).

It is interesting that the feeding value (growth/intake) of many unpalatable accessions was as high as the lucerne control (e.g. Crotalaria albida 37050), reaffirming that low weight gain was due to decreased intake not quality of the feed eaten.

Differences in intake were also related to rat size. The mean initial weight of each batch of rats (there were 20 batches) varied from 48–87 gms. This is reflected in the different levels of weight gain and intake required for significant difference from the control in the Tables. The significant differences indicated refer to the controls for the batch used to assess that accession.

All attributes measured varied both within and between species. It is unlikely that this variation was due to errors in nomenclature as voucher specimens were identified by the Queensland Herbarium (BRI).

At the species level, only 40 of the 150 listed in Table 1 could be classed as acceptable, non toxic feeds. These were Atylosia albicans, Cassia biensis, C. coluteoides, C. hammersleyensis, C. leschenaultiana, C. patellaria, C. pilosa, C. rotundifolia, Chamaechrista fasciculata, Codariocalyx gyroides, Crotalaria alata, C. filifolia, C. goreensis, C. grantiana, C. juncea, C. laburnifolia, C. medicaginea, C. ochroleuca, C. pumila, C. semperflorens, C. spinosa, C. verrucosa, Cyamopsis senegalensis, Desmanthus virgatus, Dichilus lebeckiodes, Indigofera aspera, I. astragalina, I. brevicalyx, I diphylla, I. glandulosa, I. heterotricha, I. pilosa, I. trifoliata, Rhynchosia minima, Stylosanthes hamata, S. scabra, Tephrosia interrupta, T. linearis, T. radicans, Vigna oblongifolia. Other species marginally acceptable as rat feeds could be quite safe for ruminants. This would required further testing with large animals.

A number of species we tested have long been recognised as toxic or unpalatable, e.g. Cassia barclayana, C. floribunda, C. occidentalis, Crotalaria pallida, C. retusa, C. spectabilis, Indigofera linnaei (= I. dominii), I. spicata and Tephrosia vogelii (Everist 1981; Watt and Breyer-Brandwijk 1962). The same authors report either variable toxicity or suspicion of toxicity for Crotalaria incana, C. juncea, C. laburnifolia, C. linifolia, C. rhodesiae and Tephrosia purpurea. Our results showed that C. incana was generally unpalatable and non toxic although there was trend towards toxicity with two accessions. C. juncea was a desirable feed even though accession 71020 was suspect; C. rhodesiae was not toxic or unduly unpalatable and Tephrosia purpurea was generally toxic and

unpalatable. Other species which varied in palatability and toxicity were Cassia absus, C. mimosoides, C. occidentalis, C. tora, Crotalaria maypurensis, C. senegalensis, Indigofera hirsuta, I. schimperi, I. tinctoria and Tephrosia subtriflora.

Of the 59 species tested as seed feeds, only six could be classed as definitely toxic to rats. These were Cassia hirsuta, Crotalaria pilosa, C. rhodesiae, Indigofera linnaei, I. spicata and Tephrosia hirsuta.

Seed feeds did not always reflect the toxicity of the vegetative feeds as indicated by the difference in observed and expected weight gain, but they did confirm the palatability of the feed as represented by intake and weight gain.

This technique for evaluating forages does provide a clear distinction between the good and bad extremes but there is some doubt attached to the middle ground that can only be resolved by histology.

The material we have evaluated represents only 30% of the total collection of Cassia, Crotalaria, Indigofera and Tephrosia accessions held by the Australian Tropical Forages Genetic Resources Centre, CSIRO Division of Tropical Crops and Pastures, Brisbane, Australia. At the species level, we have evaluated 70% of Tephrosia species and 50% of species in the collection of each of the other three genera above - financial strictures forced closure of the program before its completion. The number of species represented in the collection is only 10-15% of the known number of species for each genus (Hutchinson 1964; Willis 1966) - not all of which are forage species (i.e. herbs or small shrubs).

Acknowledgements

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Table 1. The accessions fed vegetatively, their nitrogen [N] and fibre [NDF] contents, and the mean liveweight gain [LWG], digestible dry matter intake [DDMI], feeding value [LWG/DDMI], and difference between observed [O] and expected [E] liveweight gain obtained when fed to rats.

C.P.I.	Species	Type	N [%]	NDF [%]	LWG [g/d]	DDMI [g/d]	LWG/DDMI [g/g]	O-E
Controls								
	Lucerne H.R. ad lib [n=15]		3.59	30.9	2.81	7.09	.40	
	" restrict I [n=11]				1.13**	4.16**	.27**	
	" " II [n=9]				0.36**	2.96**	.12**	
	" " III [n=5]				-0.23**	2.16**	-.11**	
Test feeds								
79606	Atylosia albicans	V	1.84	52.8	2.99	8.68	.34	-.10
60176	Cassia absus	V	1.57	47.3	1.54**	3.89**	.40	.38*
69488	Cassia absus	V	1.55	54.3	1.64**	6.02**	.27	-.40*
71063	Cassia absus	V	0.85	64.4	2.68	6.35	.42	.10
79073	Cassia absus	V	1.32	44.7	0.73**	3.52**	.21**	-.16
Q10055	Cassia absus	V	2.02	50.8	1.08**	4.17**	.26**	-.20
Q9861	Cassia absus	V	2.79	41.2	1.75**	6.21**	.28	-.38*
28535	Cassia alata	V	1.94	41.9	-0.97**	1.98**	-.49**	-.60**
CQ1472	Cassia alata	V	2.09	37.8	-0.68**	2.08**	-.33**	-.38*
CQ1637	Cassia artemesioides	V	2.13	14.5	0.43**	5.16**	.08**	-1.45**
CQ378	Cassia barclayana	V	1.84	55.1	0.78**	4.00**	.20**	-.40*
69489	Cassia biensis	V	3.39	42.7	3.09	8.66	.36	.02
38536	Cassia biflora	V	2.89	45.9	2.72	5.31**	.51*	.70**
CQ1497	Cassia coluteoides	V,P	1.76	31.5	2.37	6.47	.37	-.19
40046	Cassia desvauxii	V	2.31	56.4	1.47**	5.38**	.27*	-.57**
30693	Cassia didymobotrya	V	1.99	49.1	-0.61**	3.94**	-.15**	-1.98**
33217	Cassia diphylla	V,P	1.97	45.8	0.26**	2.62**	.10**	.57**
33217	Cassia diphylla	V	1.39	59.9	1.56**	3.65**	.43	.03
33422	Cassia diphylla	V	1.60	60.0	0.97**	3.50**	.28**	.08
40050	Cassia diphylla	V	2.43	40.1	-0.19**	2.32**	-.08**	-.18
60179	Cassia falcinella	V	1.78	44.4	2.42	5.67**	.43	.19
70283	Cassia floribunda	V	2.81	41.5	0.18**	2.81**	.06**	-.12
CQ1524	Cassia hammersleyensis	V	2.33	41.6	2.10	5.80	.36	-.12
29432	Cassia hirsuta	V	2.65	34.9	2.85	7.73	.37	-.43*
29508	Cassia hirsuta	V	1.57	-	3.05	7.88	.39	-.03
29567	Cassia hirsuta	V	2.43	31.5	3.16	8.89	.36	-.55**
36375	Cassia hirsuta	V	2.70	39.0	2.71	6.97	.39	-.15
29396	Cassia leschenaultiana	V,P	1.41	55.0	2.93	5.71	.51*	.75**
24053	Cassia mimosoides	V	2.05	47.8	2.74	5.58	.49*	.64**
28688	Cassia mimosoides	V	2.12	45.9	1.75*	4.47*	.39	.30
28899	Cassia mimosoides	V	2.06	65.2	2.90	7.35	.39	-.02
29436	Cassia mimosoides	V	1.27	56.7	2.49	7.50	.33	-.54**
29568	Cassia mimosoides	V	2.09	53.9	1.90	6.69	.28*	-.78**
60177	Cassia mimosoides	V,P	1.56	67.0	1.95**	5.01**	.39	.04
60177	Cassia mimosoides	V	1.34	53.5	2.01*	5.17**	.39	.08
60178	Cassia mimosoides	V	1.05	54.9	1.74**	7.03	.25*	-1.11**
P11831	Cassia mimosoides	V	1.69	58.0	2.69	7.12	.38	-.15
33484	Cassia nairobensis	V	2.23	37.9	-2.12**	2.00**	-1.06**	-1.80**
29545	Cassia obtusifolia	V	2.45	42.9	0.66**	4.73**	.14**	-1.23**
36377	Cassia obtusifolia	V	2.39	41.2	0.45**	3.13**	.14**	-.17
40045	Cassia obtusifolia	V	2.95	37.1	0.15**	2.42**	.06**	.08
60847	Cassia obtusifolia	V	1.54	75.7	0.90**	3.70**	.24**	-.12

C.P.I.	Species	Type	N [%]	NDF [%]	LWG [g/d]	DDMI [g/d]	LWG/DDMI [g/g]	O-E
29572	Cassia occidentalis	V	3.08	37.7	0.86**	4.91**	.18**	-1.13**
29573	Cassia occidentalis	V	1.78	35.2	0.79**	5.14**	.15**	-1.34**
30692	Cassia occidentalis	V	2.47	36.8	0.37**	4.20**	.09**	-1.18**
30864	Cassia occidentalis	V	2.68	38.2	0.95**	3.23**	.29**	.26
36376	Cassia occidentalis	V	2.99	43.1	1.35**	3.92**	.34	.18
73050	Cassia occidentalis	V	2.88	33.2	0.59**	2.96**	.20**	.10
81422	Cassia occidentalis	V	2.05	50.8	0.91**	3.26**	.28*	.27
CQ377	Cassia occidentalis	V	2.61	39.6	0.66**	3.04**	.22**	.18
CQ377	Cassia occidentalis	V	2.90	39.2	1.10**	4.32**	.25**	.02
P7641	Cassia occidentalis	V	3.67	34.7	1.13**	3.52**	.32*	.32
30863	Cassia patellaria	V	1.07	60.0	3.21	8.31	.39	-.33
57503	Cassia pilosa	V	2.54	43.5	2.75	5.52	.50	.39*
57503	Cassia pilosa	V	1.06	70.1	2.78	6.05	.46	.35
CQ1499	Cassia pleurocarpa	V	2.89	28.8	-2.68**	1.79**	-1.63**	-2.18**
34721	Cassia rotundifolia	V	1.48	48.9	3.20*	6.14	.52*	.53**
49713	Cassia rotundifolia	V,P	2.04	61.8	2.73	6.08	.45	.28
52092	Cassia rotundifolia	V	2.24	48.6	2.59	6.67	.39	-.06
78916	Cassia rotundifolia	V	1.32	55.5	2.22*	5.06*	.44	.33
Q10057	Cassia rotundifolia	V	3.26	48.8	2.39	6.56	.36	-.21
Q9862	Cassia rotundifolia	V	3.22	47.3	2.86	8.27	.35	-.10
38538	Cassia sericea	V,P	2.20	59.6	1.82**	6.77*	.27*	-.91**
55694	Cassia sericea	V	3.21	39.8	2.21	6.87*	.32	-.22
34722	Cassia serpens	V	1.23	59.9	1.96*	6.97	.28*	-.86**
79601	Cassia sturtii	V	1.54	41.9	1.55**	6.82*	.23**	-.85**
28900	Cassia tora	V	1.64	52.1	2.60	5.71	.46	.43*
73049	Cassia tora	V	3.79	36.8	1.60**	4.65**	.34	.01
83014	Cassia tora	V	3.08	37.9	2.69	7.71	.35	-.07
83015	Cassia tora	V	2.44	41.0	2.18*	7.45	.29	-.49**
Q9844	Cassia trichopoda	V	3.03	48.9	2.08*	7.45	.28*	-.16
CQ1528	Cassia venusta	V	2.66	42.3	-0.14**	2.91**	-.05**	-.50**
13407	Chamaecrista fasciculata	V	0.84	65.2	2.74	6.07	.45	.30
14343	Codariocalyx gyroides	V	-	-	3.08	7.83	.39	.02
49082	Codariocalyx gyroides	V	-	-	3.31	7.39	.45	.50**
33195	Crotalaria alata	V	1.49	59.0	2.03	5.45	.37	-.19
37050	Crotalaria albida	V	2.26	52.2	1.83**	4.71**	.39	.15
37050	Crotalaria albida	V	2.18	37.3	2.10**	5.74**	.37	-.16
32105	Crotalaria anagyroides	V	1.24	53.5	2.48	6.10	.41	-.15
32105	Crotalaria anagyroides	V	1.49	64.6	2.14**	5.49**	.39	.01
34157	Crotalaria anagyroides	V	3.09	37.1	1.63**	5.73**	.28**	-.25
81424	Crotalaria anagyroides	V	2.37	45.5	0.77**	4.81**	.16**	-.58**
81425	Crotalaria anagyroides	V	2.48	45.6	2.54	8.05	.31	-.34
81427	Crotalaria anagyroides	V	2.48	53.1	0.58**	4.37**	.13**	-.82**
29598	Crotalaria atrorubens.aff	B,L	2.92	54.3	-0.32**	2.36**	-.14**	.02
30867	Crotalaria brevidens	V	2.42	50.7	0.23**	3.61**	.06**	-.37*
P1439	Crotalaria brownei	V	2.28	-	2.12*	6.08*	.35	.19
30123	Crotalaria calycina	V	2.14	52.5	1.96**	6.77	.29*	-.45*
60186	Crotalaria christantiflora	V	1.96	58.9	2.10*	7.09	.29	-.76**
60186	Crotalaria christantiflora	V,P	1.56	63.4	2.87	7.37	.39	-.13
33810	Crotalaria filifolia	V	1.75	55.2	2.60	7.08	.37	.11
34873	Crotalaria filifolia	V	1.62	-	3.24*	8.56*	.38	.23
35009	Crotalaria filifolia	V	1.16	60.2	2.77	6.43	.43	.02

C.P.I.	Species	Type	N [%]	NDF [%]	LWG [g/d]	DDMI [g/d]	LWG/DDMI [g/g]	O-E
39530	Crotalaria goreensis	V	1.11	-	2.55	7.35	.35	-.33
13378	Crotalaria grahamiana	V	2.30	30.7	1.94**	7.37	.26*	-.54**
27831	Crotalaria grantiana	V	1.92	56.3	3.34**	8.35**	.40	.39*
29452	Crotalaria incana	V	1.21	55.5	2.46	8.14	.30	-.31
33811	Crotalaria incana	V	1.51	44.5	0.77**	3.65**	.21**	.14
38550	Crotalaria incana	V	1.75	66.6	2.35	5.55**	.42	.17
38551	Crotalaria incana	V	2.12	57.9	0.67**	3.66**	.18**	.03
39150	Crotalaria incana	V	2.42	-	2.72	7.16	.38	.20
50394	Crotalaria incana	V	1.47	-	1.48**	4.98**	.30**	-.22
61021	Crotalaria incana	V	2.08	87.5	1.95**	5.31**	.37	-.09
CQ1101	Crotalaria incana	V	2.01	63.7	3.16**	8.52**	.37	.15
71013	Crotalaria juncea	V	1.60	62.5	3.21**	8.22**	.39	.26
71014	Crotalaria juncea	V	2.39	-	2.92	8.00*	.37	.09
71017	Crotalaria juncea	V	2.18	-	2.64	6.88	.38	.23
71018	Crotalaria juncea	V	2.13	57.0	2.50	7.00	.36	-.01
71019	Crotalaria juncea	V	1.50	-	2.46	7.39	.33	-.15
71020	Crotalaria juncea	V	1.64	-	2.56	8.12**	.32	-.30
71228	Crotalaria juncea	V	1.78	58.8	3.20**	7.70*	.42	.46*
CQ1466	Crotalaria juncea	V	2.19	55.5	2.57	6.38	40	.05
29787	Crotalaria laburnifolia	V	1.47	63.2	2.35	5.73	.41	-.08
P4434	Crotalaria laburnifolia	V	2.11	49.6	2.19	5.37	.41	-.04
P1422	Crotalaria lanata	L,P	2.86	29.9	-0.53**	2.78**	-.19**	-.35*
P1422	Crotalaria lanata	B	1.12	72.3	0.76**	3.86**	.20**	-.36*
29793	Crotalaria linifolia	V	1.92	49.1	1.88**	7.05	.27*	-.47**
34109	Crotalaria longithyrsa	V	1.94	51.7	1.20**	5.10**	.24**	-.36*
33423	Crotalaria maypurensis	V	2.16	52.6	1.64*	4.99*	.33	-.38*
33918	Crotalaria maypurensis	V	2.33	47.2	2.72	6.91	.39	-.03
33918	Crotalaria maypurensis	V	1.37	61.1	3.76*	9.87	.38	.55**
CQ778	Crotalaria medicaginea	V	1.51	62.9	3.42	9.60	.36	.31
13697	Crotalaria mysorensis	V	1.78	59.5	0.99**	4.60**	.22**	-.25
43320	Crotalaria nitens	V	1.92	53.1	-0.32**	3.20**	-.10**	-.62**
43320	Crotalaria nitens	V	2.24	53.0	-0.89**	1.31**	-.68**	-.01
43754	Crotalaria ochroleuca	V	1.92	58.8	2.34	6.68	.35	-.03
60992	Crotalaria ononoides	V	1.24	57.9	0.87**	4.32**	.20**	-.71**
60992	Crotalaria ononoides	V	1.27	66.3	1.80**	7.94	.23**	-.61**
60189	Crotalaria oocarpa	V	2.38	-	2.80	7.25	.39	-.03
60189	Crotalaria oocarpa	V	2.28	52.5	0.94**	4.80**	.20**	-.38*
13377	Crotalaria pallida	V	2.74	43.4	-0.52**	2.25**	-.23**	-.18
29447	Crotalaria pallida	V	2.59	49.9	-0.36**	2.86**	-.13**	-.36*
29593	Crotalaria pallida	V	2.44	54.4	-0.17**	2.67**	-.06**	-.60**
29594	Crotalaria pallida	V	2.24	53.4	-0.19**	2.65**	-.07**	-.08
30697	Crotalaria pallida	V	2.89	52.4	-0.38**	2.06**	-.18**	.21
30870	Crotalaria pallida	V	2.95	46.6	-0.44**	2.80**	-.16**	-.98**
36382	Crotalaria pallida	V	2.56	52.6	-0.15**	2.67**	-.06**	-.03
38494	Crotalaria pallida	V	2.53	57.1	0.05**	4.01**	.01**	-.65**
38548	Crotalaria pallida	V	2.80	49.1	1.54**	5.20**	.30**	-.42*
60852	Crotalaria pallida	V	3.37	37.7	-1.22**	1.46**	-.84**	-.47**
30201	Crotalaria pallida.aff	V	3.19	39.2	-0.67**	2.57**	-.26**	-.32
76988	Crotalaria paulina	V	3.13	37.8	-1.58**	2.02**	-.78**	-.93**
38555	Crotalaria pilosa	V	1.85	55.1	2.35	5.47	.43	.07
53952	Crotalaria pilosa	V	2.04	52.6	2.64	8.82	.30	-.33
81428	Crotalaria pilosa	V	1.94	45.7	2.40	8.17	.29	-.52**
76044	Crotalaria pumila	V	1.52	56.1	3.14	9.68	.32	-.03
32026	Crotalaria quinquefolia	V	1.77	55.3	1.80**	6.87	.26*	-.98**

C.P.I.	Species	Type	N [%]	NDF [%]	LWG [g/d]	DDMI [g/d]	LWG/DDMI [g/g]	O-E
71124	Crotalaria retusa	V	2.04	47.7	-0.72**	1.91**	-.38**	-.01
72097	Crotalaria retusa	V	2.72	43.7	-1.18**	4.07**	-.32**	-2.07**
18417	Crotalaria rhodesiae	V	2.27	44.0	1.71**	5.67**	.30	-.16
52955	Crotalaria rhodesiae	V	2.72	37.3	2.68	8.55	.31	-.19
60848	Crotalaria rhodesiae	V	1.79	53.1	2.77	8.45	.33	-.10
CQ955	Crotalaria semperflorens	V	2.32	37.7	2.15	6.86	.31	-.30
34155	Crotalaria senegalensis	V	2.66	51.4	-0.13**	2.66**	-.05**	-.03
CQ1371	Crotalaria senegalensis	V	1.89	57.6	3.65*	8.81	.41*	.69**
CQ1104	Crotalaria spectabilis	V	1.90	-	-0.07**	3.10**	-.02**	- .52**
71066	Crotalaria sphaerocarpa	V	2.07	59.2	1.55**	5.92**	.26**	-.45*
60850	Crotalaria spinosa	V	1.27	63.8	3.17*	6.57	.48	.37*
33200	Crotalaria verrucosa	V	1.92	53.9	2.26	5.71	.40	-.16
36381	Crotalaria vitellina	V	1.63	-	2.76	7.77	.36	-:35*
38557	Crotalaria vitellina	V	2.18	-	1.90	6.00	.32	-.09
38558	Crotalaria vitellina	V	2.62	-	1.81**	6.22	.29**	-.56**
29449	Crotalaria zanzibarica	V,P	1.85	47.0	2.25*	8.31	.27*	-.57**
29582	Crotalaria zanzibarica	V	3.19	39.5	1.20**	4.45*	.27*	-.47**
60225	Cyamopsis senegalensis	V	1.50	47.9	2.73	6.67	.41	.07
38539	Dalea nigra	V	1.62	49.8	0.89**	3.04**	.29**	.33
50992	Desmanthus virgatus	V	3.31	35.7	3.08	9.11**	.34	-.09
CQ1613	Desmanthus virgatus	V	2.85	43.1	3.18	9.28**	.34	-.05
73595	Dichilus lebeckioides	V	1.21	71.2	2.99*	6.29	.48*	.38*
18298	Indigofera antunesiana	V	1.56	64.6	2.79	7.12	.39	-.20
67706	Indigofera antunesiana	V	1.74	49.8	0.88**	3.70**	.24**	-.12
74815	Indigofera antunesiana	V	1.88	62.4	2.29*	6.12**	.38	-.15
40761	Indigofera arenaria	V	1.25	71.0	0.64**	3.53**	.18**	-.36*
36717	Indigofera aspera	V	1.75	50.3	2.65	6.68	.40	-.06
21018	Indigofera astragalina	V	2.18	-	2.37	6.87	.34	-.30
32951	Indigofera brevicalyx	V	1.62	45.5	2.21	5.84	.38	-.18
29065	Indigofera circinella	V	1.63	40.0	1.15**	4.47**	.26**	- .37*
CQ1377	Indigofera colutea	V	2.18	35.6	2.68	6.07*	.44	.31
40614	Indigofera diphylla	V	1.70	50.2	3.45**	8.19**	.42*	.49**
13729	Indigofera glandulosa	V	0.98	69.8	2.92	6.64	.44	.14
71069	Indigofera heterotricha	V	1.24	72.0	2.90	7.01	.41	-.03
21468	Indigofera hirsuta	V	1.34	59.6	2.72	7.27	.37	-.24
28915	Indigofera hirsuta	V,P	1.97	39.0	1.56**	5.47**	.29**	-.64**
28915	Indigofera hirsuta	B	0.77	75.2	2.79	6.50*	.43	.05
33166	Indigofera hirsuta	V	2.18	-	2.27	6.67	.34	-.32
33166	Indigofera hirsuta	V	1.11	71.3	3.37	7.89	.41	.23
40169	Indigofera hirsuta	V	1.22	47.0	1.71**	5.68**	.30**	-.42*
40172	Indigofera hirsuta	V,P	1.50	55.6	2.19	5.92	.37	-.25
43773	Indigofera hirsuta	V	1.28	53.4	2.31	6.12	.38	-.43*
52962	Indigofera hirsuta	V	1.76	52.8	1.57**	5.13**	.31**	-.35
82710	Indigofera hirsuta	V	2.68	40.0	1.72**	7.02	.25**	-.77**
29981	Indigofera hochstetteri	V	2.96	35.5	2.50*	5.92**	.42	.04
29981	Indigofera hochstetteri	V	2.16	52.6	2.85	7.52	.38	.13
39087	Indigofera lespedezioides	V	1.85	52.3	2.01**	6.06**	.33**	-.42*
CQ1378	Indigofera linifolia	V	2.35	39.8	1.88**	5.38**	.35	-.12
CQ3012	Indigofera linnaei	V,P	1.36	61.8	2.21	6.08*	.36	-.30

C.P.I.	Species	Type	N [%]	NDF [%]	LWG [g/d]	DDMI [g/d]	LWG/DDMI [g/g]	O-E
51423	Indigofera microcarpa.aff	V	2.23	29.6	-0.64**	1.91**	-.34**	-.25
78906	Indigofera nummulariifolia	V	2.54	28.1	0.76**	3.58**	.21**	-.11
78907	Indigofera nummulariifolia	V	2.78	29.5	1.11**	3.83**	.29**	.07
58124	Indigofera patens	V	3.09	46.2	1.70**	4.83**	.35*	-.06
21353	Indigofera pilosa	B,L	1.40	56.1	2.82	7.15	.39	-.14
21353	Indigofera pilosa	L	1.72	53.6	2.90	7.09	.41	.01
79066	Indigofera pumila.aff	V	1.45	67.7	2.06*	5.43**	.38	.03
34897	Indigofera sabulicola	V	2.40	29.0	-0.56**	2.17**	-.26**	-.39*
40173	Indigofera sabulicola	V	1.29	48.0	-0.16**	2.14**	-.09**	-.09
16055	Indigofera schimperi	V	0.97	61.1	3.27	7.67	.43	.15
16055	Indigofera schimperi	V	2.02	41.5	2.65	8.32	.32	-.31
65477	Indigofera schimperi	V,P	2.01	41.1	2.03**	5.38**	.38	- .14
65477	Indigofera schimperi	B	1.04	63.4	1.35**	4.02**	.34**	-.03
69495	Indigofera schimperi	V	1.53	34.3	1.65**	5.49*	.30	-.43*
73608	Indigofera schimperi	V	1.66	53.6	2.82	7.19	.39	-.20
47080	Indigofera secundiflora	V	3.49	40.7	1.06**	5.11**	.20*	-.49**
74816	Indigofera secundiflora	V	1.89	39.6	0.27**	2.79**	.10**	-.18
16069	Indigofera spicata	V	1.68	49.7	0.03**	3.63**	.01**	.16
16110	Indigofera spicata	V	1.77	45.0	-0.87**	1.13**	-.77**	.09
16110	Indigofera spicata	V	1.85	-	0.76**	3.70**	.21**	-.13
18421	Indigofera spicata	V	1.95	49.2	1.43**	4.18**	.34	.03
18422	Indigofera spicata	V	3.43	41.8	0.32**	3.12**	.08**	-.20
18557	Indigofera spicata	B	1.58	49.5	-0.96**	1.37**	-.71**	-.22
18557	Indigofera spicata	L	2.27	38.8	-0.84**	1.21**	-.69**	.05
18683	Indigofera spicata	V	2.05	36.4	-0.48**	2.53**	-.19**	-.23
18683	Indigofera spicata	V	3.17	30.7	-3.02**	1.53**	-1.99**	-1.97**
18731	Indigofera spicata	V	3.20	32.2	-3.22**	1.61**	-2.00	-2.18**
18731	Indigofera spicata	V	2.32	42.3	-0.35**	2.75**	-.13**	-.27
21458	Indigofera spicata	V	2.73	43.6	-2.10**	1.02**	-1.92**	-.87**
21458	Indigofera spicata	V	2.13	37.3	-0.29**	2.98**	-.10**	-.39*
21459	Indigofera spicata	V	2.37	45.2	-1.41**	1.72**	-.82**	-.49**
21460	Indigofera spicata	V	2.31	45.9	-1.30**	1.90**	-.68**	-.54**
23341	Indigofera spicata	V	2.05	44.7	-1.21**	1.82**	-.66**	-.38*
23402	Indigofera spicata	V	2.38	47.0	-1.45**	1.74**	-.83**	-.55**
23404	Indigofera spicata	V	2.05	47.8	-0.74**	2.24**	-.33**	-.25
23405	Indigofera spicata	V	1.98	52.7	-0.81**	2.08**	-.39**	-.19
23407	Indigofera spicata	V	2.22	56.7	-1.54**	1.61**	-.97**	-.53**
23553	Indigofera spicata	V	2.16	52.2	-0.42**	2.48**	-.17**	-.13
25694	Indigofera spicata	V	2.49	46.3	-1.02**	2.06**	-.50**	-.38*
25695	Indigofera spicata	V	2.09	38.6	-0.42**	2.52**	-.17**	-.16
25695	Indigofera spicata	V	3.17	44.0	-2.33**	0.99**	-2.32**	-1.09**
27410	Indigofera spicata	V	2.35	50.4	-0.90**	2.23**	-.40**	-.40*
29066	Indigofera spicata	V	1.69	38.1	0.85**	3.56**	.24**	-.14
29067	Indigofera spicata	V,P	2.05	37.9	-1.55**	1.65**	-.94**	-.95**
29068	Indigofera spicata	V	2.42	40.1	1.61**	5.48**	.29	-.12
29069	Indigofera spicata	V	2.09	38.2	0.05**	2.76**	.02**	-.26
29295	Indigofera spicata	V	2.99	33.2	-1.07**	1.50**	-.71**	-.44*
29485	Indigofera spicata	V	3.58	33.0	-2.24**	.85**	-2.60**	-.88**
29747	Indigofera spicata	V	2.15	36.3	-0.46**	1.66**	-.28**	.03
29747	Indigofera spicata	V	2.11	44.6	-1.81**	1.87**	-.97**	-1.40**
30153	Indigofera spicata	V	2.43	37.9	-2.62**	1.70**	-1.54**	-1.67**
30216	Indigofera spicata	V	2.95	35.9	-1.03**	1.66**	-.62**	-.34*
30219	Indigofera spicata	V	1.19	44.6	-0.69**	2.01**	-.34**	-.48**
30492	Indigofera spicata	V	2.41	33.0	-1.09**	1.06**	-1.03**	-.07

C.P.I.	Species	Type	N [%]	NDF [%]	LWG [g/d]	DDMI [g/d]	LWG/DDMI [g/g]	O-E
32703	Indigofera spicata	V	1.51	52.5	0.66**	3.28**	.20**	-.16
32867	Indigofera spicata	V	3.67	31.7	-1.64**	0.97**	-1.78**	-.38*
33162	Indigofera spicata	L	3.19	22.2	-1.01**	1.09**	-.93**	-.02
33162	Indigofera spicata	B	1.63	48.6	-0.77**	1.55**	-.50**	-.19
37384	Indigofera spicata	V	3.58	32.9	-2.35**	1.10**	-2.20**	-1.21**
37389	Indigofera spicata	V	1.69	50.7	0.75**	3.52**	.21**	-.24
37686	Indigofera spicata	V	1.67	64.4	2.26**	5.83**	.39	-.14
38211	Indigofera spicata	V	2.17	49.3	0.49**	2.80**	.18**	.03
39088	Indigofera spicata	V	1.58	37.0	-0.22**	2.43**	-.09**	-.26
39088	Indigofera spicata	V	1.54	56.2	-1.24**	1.22**	-1.02**	-.21
40170	Indigofera spicata	V	2.75	35.4	-0.44**	2.85**	-.15**	-.46*
40545	Indigofera spicata	V,P	2.84	33.7	0.47**	3.22**	.15**	-.27
43774	Indigofera spicata	V	1.72	46.9	1.91**	5.49**	.35	-.30
65478	Indigofera spicata	V	2.54	40.8	-0.73**	1.55**	-.47**	-.15
CQ1671	Indigofera spicata	V	3.14	35.2	-0.58**	1.84**	-.32**	-.22
19577	Indigofera suffruticosa	V	3.84	26.2	1.51**	5.37**	.28	-.16
28919	Indigofera suffruticosa	V	3.10	37.7	1.75**	5.55*	.32*	-.57**
29746	Indigofera suffruticosa	V	1.21	63.8	1.95**	5.47**	.36	-.24
75129	Indigofera suffruticosa	V	2.44	45.2	2.05*	5.71**	.36	-.13
Q9846	Indigofera suffruticosa	V	3.11	41.8	1.85**	7.20	.26	-1.13**
21049	Indigofera teysmanni	V	4.11	25.9	1.77**	6.47**	.27	-.49**
21049	Indigofera teysmanni	V	3.18	31.0	1.10**	4.43**	.25**	-.33
30154	Indigofera teysmanni	V	3.24	36.6	1.33**	5.02**	.26	-.16
24207	Indigofera tinctoria	V	1.50	54.7	2.63	6.77	.39	-.13
24207	Indigofera tinctoria	V	3.70	34.1	1.86**	6.54**	.28	-.43*
29506	Indigofera tinctoria	V	2.50	48.1	2.67	5.79	.46	.23
29749	Indigofera tinctoria	V	1.16	61.6	2.17	6.12	.35	-.36
32973	Indigofera tinctoria	V	3.08	35.0	1.97**	7.41**	.27	-.58**
34156	Indigofera tinctoria	V	2.25	-	2.12	7.07	.30	-.36*
69504	Indigofera tinctoria	V	1.70	48.2	1.22**	4.66**	.26**	-.07
71068	Indigofera tinctoria	V,P	3.51	31.1	1.87**	5.80**	.32**	-.20
71068	Indigofera tinctoria	B	1.12	64.9	3.22	7.46	.43	.10
30064	Indigofera trifoliata	V	0.85	68.9	3.41	7.75	.44	.15
15435	Indigofera trita	V	2.08	54.3	1.73**	5.24**	.33*	-.33
15435	Indigofera trita	V,P	0.93	69.4	2.66	6.78	.39	-.18
18017	Indigofera trita	V,P	3.58	35.7	0.52**	3.58**	.15**	-.52**
18017	Indigofera trita	V,P	3.26	38.0	1.69**	4.46**	.38	.07
23606	Indigofera trita	V	1.96	55.6	1.02	4.24	.24	.04
26664	Indigofera trita	V	1.59	58.4	1.35**	4.59**	.29**	-.25
29630	Indigofera trita	V	2.22	54.4	1.30**	4.54**	.29**	-.26
33164	Indigofera trita	V	1.29	72.3	2.00*	5.94*	.34	-.29
34657	Indigofera trita	V	2.99	28.9	1.73**	5.23**	.33*	-.33
34657	Indigofera trita	V	1.17	69.9	2.50	6.51	.38	-.21
36692	Indigofera trita	V,P	3.08	28.7	0.35**	2.69**	.13**	.01
37149	Indigofera trita	V	3.06	43.5	-1.20**	1.73**	-.69**	-.61**
37433	Indigofera trita	V	2.64	41.8	-0.49**	2.68**	-.18**	-.67**
40546	Indigofera trita	V	2.49	47.3	2.28	6.03	.38	-.21
69494	Indigofera vicioides	L,P	2.14	50.2	1.84**	4.84**	.38	.01
69494	Indigofera vicioides	B	0.96	71.7	2.79	6.80	.41	-.06
69497	Indigofera vicioides	V	1.30	69.6	2.51*	5.68**	.44	.19
32866	Indigofera volkensii	V	1.91	59.0	2.62	6.91	.38	-.12
32866	Indigofera volkensii	V	1.50	57.0	2.50*	7.10	.35	-.50**
50063	Indigofera zanzibarica	V	2.23	25.4	0.14**	2.35**	.06**	.07

C.P.I.	Species	Type	N [%]	NDF [%]	LWG [g/d]	DDMI [g/d]	LWG/DDMI [g/g]	O-E
	Leucaena cv.Cunningham[20%]	V	4.64	12.4	0.62**	3.47**	.18**	-.47**
	Leucaena cv.Cunningham[10%]	V	-	-	1.99**	6.10	.33**	-.25
29996	Mimosa pigra	V	2.47	35.4	3.06	7.98	.38	-.38*
60314	Otoptera burchellii	V	3.35	39.1	2.22*	8.11	.28	-.58**
CQ1601	Psoralea eriantha	V	2.06	57.8	1.24**	4.61**	.27**	-.39*
36696	Rhynchosia minima	V	2.60	46.9	2.73	8.27	.33	-.22
Verano	Stylosanthes hamata	V	1.63	54.3	3.18	9.19	.35	.12
Seca	Stylosanthes scabra	V	0.97	75.3	4.00**	9.87*	.41	.79**
55868	Stylosanthes scabra	V	1.82	41.2	3.34	8.93	.37	.34
34904	Stylosanthes viscosa[-lipid]	V	1.31	65.5	2.46	6.37	.39	-.08
34904	Stylosanthes viscosa	V	1.35	61.0	2.21	5.32**	.42	.22
40765	Tephrosia bracteolata	V	2.20	56.3	1.96**	6.76*	.29	-.42*
40765	Tephrosia bracteolata	V	1.43	67.1	2.70	8.51	.32	-.18
47088	Tephrosia bracteolata	V	2.07	-	2.30	7.03	.33*	-.44*
61234	Tephrosia brandegei	V	1.83	54.3	0.74**	3.45**	.21**	- .07
60363	Tephrosia burchellii	V	1.63	56.3	0.31**	2.97**	.10**	- .41*
43435	Tephrosia candida	V	1.42	60.5	0.30**	2.65**	.11**	.38*
79673	Tephrosia cathartica	V	1.95	58.0	1.74**	7.04	.25*	-.77**
50993	Tephrosia cinerea	V	1.89	53.4	1.62**	4.89**	.33	-.14
57505	Tephrosia cinerea	V	2.32	34.5	1.28**	4.63**	.27**	-.40*
57963	Tephrosia cinerea	V	2.48	41.8	0.91**	3.64**	.25**	-.25
40305	Tephrosia circinella	V	2.31	-	-0.30**	2.98**	-.10**	-.29
70291	Tephrosia cordata	V	1.38	68.9	1.46**	4.15**	.35	.20
35021	Tephrosia cuneata	B,L	1.37	65.9	2.26	5.97*	.38	.23
30878	Tephrosia dichotoma	V	2.09	60.8	0.95**	3.64**	.26**	.04
37928	Tephrosia elata	V	1.53	40.1	-0.85**	1.91**	-.45**	-.70**
CQ1360	Tephrosia flagellaris	V	1.65	53.3	1.54**	4.47**	.34	.01
CQ1468	Tephrosia glomulifera	V	2.60	33.6	1.75**	4.77**	.37	.03
49180	Tephrosia grandiflora	V	1.68	54.5	-1.43**	1.57**	-.91**	-.42*
17839	Tephrosia holstii	V	3.50	35.5	2.25*	8.57	.26*	-.65**
32868	Tephrosia holstii	L	3.11	35.7	1.36**	4.50**	.30	-.18
32868	Tephrosia holstii	V	2.26	57.3	0.52**	4.13**	.13**	-.77**
32868	Tephrosia holstii	B	1.54	65.1	0.19**	2.97**	.06**	-.29
60873	Tephrosia holstii.aff	V	0.62	-	1.44**	4.87**	.30	.07
12369	Tephrosia hookeriana	V	1.23	-	1.42**	4.48**	.32	.29
29766	Tephrosia hookeriana	V	2.35	36.9	0.93**	3.65**	.25*	-.03
30879	Tephrosia hookeriana	V,P	1.24	-	1.55**	5.45*	.28**	-.43*
70342	Tephrosia hookeriana	V	1.42	64.7	2.05	5.15*	.40	-.10
54972	Tephrosia interrupta	V	2.49	47.7	2.30	6.44	.36	-.25
Q6997	Tephrosia leptostachya	V	2.17	51.9	1.45**	6.38**	.23*	-.76**
17745	Tephrosia linearis	V	1.34	70.5	2.99	8.03	.38	-.20
17745	Tephrosia linearis	V	-	-	3.37	10.05*	.33	.16
37929	Tephrosia linearis.aff	V	1.92	50.4	1.96**	5.14**	.38	.55**
36719	Tephrosia longipes	V	2.30	57.6	0.31**	2.60**	.11**	.18
29631	Tephrosia noctiflora	V	1.67	59.1	0.27**	3.32**	.08**	-.61**
29768	Tephrosia noctiflora	V	2.10	61.1	0.84**	3.81**	.22**	-.44*
30140	Tephrosia noctiflora	B	1.15	69.0	3.26	8.36	.39	.44*
30140	Tephrosia noctiflora	V,P	2.25	49.3	0.83**	4.17**	.20**	.02

C.P.I.	Species	Type	N [%]	NDF [%]	LWG [g/d]	DDMI [g/d]	LWG/DDMI [g/g]	O-E
36384	Tephrosia noctiflora	B	0.70	75.1	3.58*	9.65	.37	.42*
36384	Tephrosia noctiflora	L	2.00	52.8	1.62**	5.31**	.30	.11
53263	Tephrosia noctiflora	V	2.45	57.7	2.02	5.78	.35	-.17
53680	Tephrosia noctiflora	V	1.80	63.3	2.00*	6.88	.29	-.75**
76285	Tephrosia noctiflora.aff	V	2.23	53.1	1.25**	5.45**	.23*	-.49*
66943	Tephrosia nyikensis	V	3.05	43.9	2.24	6.80	.33	-.36*
60367	Tephrosia polystachya	V	1.96	59.3	1.65*	4.46*	.37	-.06
71071	Tephrosia polystachya	V	1.32	-	2.04*	6.73	.35	-.56**
29857	Tephrosia purpurea	V	1.33	-	2.15*	6.17	.35	-.20
36435	Tephrosia purpurea	V	2.52	48.5	2.16*	6.87*	.32	-.24
36720	Tephrosia purpurea	V	1.07	75.7	3.13	9.05	.35	.12
41223	Tephrosia purpurea	V	1.98	42.3	0.52**	3.45**	.15**	- .29
52963	Tephrosia purpurea	V	2.60	54.5	1.87**	7.51	.25*	-1.17**
53264	Tephrosia purpurea	V	2.00	51.3	0.84**	4.92**	.17**	-.59**
53566	Tephrosia purpurea	V	2.37	58.1	1.51**	5.74	.26*	-.72**
53681	Tephrosia purpurea	V	3.00	42.9	0.17**	3.77**	.05**	-.51**
60370	Tephrosia purpurea	V	2.43	35.1	1.71**	5.59**	.31*	.05
69493	Tephrosia purpurea	V,P	1.30	70.6	0.35**	3.16**	.11**	-.35
69505	Tephrosia purpurea	V	1.65	57.9	2.43	7.84	.30	-.68**
69505	Tephrosia purpurea	V,P	2.19	58.6	1.65**	6.47	.26*	-.91**
69505A	Tephrosia purpurea	B	0.99	81.4	0.75**	4.23**	.18**	-.59**
69505A	Tephrosia purpurea	V	1.13	91.5	1.03**	4.64**	.22**	-.57**
71070	Tephrosia purpurea	V	1.52	51.5	2.11	4.94	.43	.12
Q10217	Tephrosia purpurea	V	2.58	54.1	1.94*	6.25	.31	-.51**
Q10218	Tephrosia purpurea	V	2.18	63.7	2.84	7.14	.40	-.02
18427	Tephrosia radicans	V	2.96	49.3	2.86	6.36	.45	.12
69506	Tephrosia rhodesica	V	1.78	61.8	0.24**	3.21**	.07**	-.60**
69507	Tephrosia stormsii	V	1.46	45.1	2.01*	6.04*	.33	-.38*
40766	Tephrosia subtriflora	V	1.60	65.2	2.79	6.04	.46	.23
71929	Tephrosia subtriflora	V,P	1.80	62.6	1.95**	5.58*	.35	-.30
27842	Tephrosia villosa	V	2.95	46.0	1.91	4.78**	.40	-.01
34121	Tephrosia villosa	V	1.65	-	1.77**	4.95**	.36	.08
39230	Tephrosia vogelii	V	1.91	-	-5.60**	.39**	-14.36**	-3.78**
39230	Tephrosia vogelii	V,P	2.41	50.0	-3.82**	.31**	-12.32**	-1.96**
41017	Teramnus labialis	V	2.47	47.2	2.27**	6.27*	.36	-.25
41017	Teramnus labialis	V	2.16	47.3	2.51	5.94*	.42	.13
49184	Vigna oblongifolia	V	2.35	40.5	3.21*	6.5	.49	.45*

C.P.I. Non-prefixed numbers are Commonwealth Plant Introduction accessions; CQ numbers are CSIRO Queensland accessions; Q numbers are Department of Primary Industries, Queensland accessions, and P numbers are New South Wales, Department of Agriculture accessions. Type: V = vegetative material of leaves and small stems; P = young pods; l = leaf material only; B = stem material only [usually older, thicker stems].

*,** = different from controls in same batch at P=0.05, P=0.01 respectively for LWG, DDMI, LWG/DDMI and from all controls regression for O-E.

Table 2. The accessions fed as seed, and the liveweight gain [LWG], dry matter intake [DMI], feeding value [LWG/DMI] and difference between observed [O] and expected [E] liveweight gain obtained when fed to rats.

C.P.I.	Species		LWG [g/d]	DMI [g/d]	LWG/DMI [g/g]	O-E
Controls fed ad lib.						
	Autoclaved soybean	[n=3]	3.34	11.51	.29	
	Lucerne H.R.	[n=3]	2.72	10.84	.25	
	Siratro	[n=1]	2.21**	9.20**	.24	
	Casein	[n=1]	2.11**	9.98*	.21*	
	I.spicata 16110	[n=3]	0.34**	5.66**	.06**	
Controls fed at restricted intake.						
	Lucerne H.R.	[n=1]	0.50	4.85	.10	
	Siratro	[n=1]	0.50	4.95	.10	
	Casein	[n=1]	0.41	4.90	.08	
Test feeds						
71063	Cassia absus		3.02	11.33	.27	-.02
69489	Cassia biensis		1.41**	6.96**	.20*	.16
38536	Cassia biflora		1.90**	8.13**	.23	.12
60179	Cassia falcinella		2.97	11.15	.27	.01
29432	Cassia hirsuta		-1.15**	3.65**	-.31**	-1.18**
29567	Cassia hirsuta		-1.64**	3.85**	-.43**	-1.75**
36375	Cassia hirsuta		-0.14**	4.60**	-.04**	-.48*
29396	Cassia leschenaultiana		2.96	11.55	.26	-.16
60177	Cassia mimosoides		3.37	12.10	.28	.04
60178	Cassia mimosoides		3.34	11.85	.28	.10
P11831	Cassia mimosoides		2.80	10.13	.28	.14
30863	Cassia patellaria		3.66	11.52	.32	.62**
57503	Cassia pilosa		3.40	11.20	.30	.41*
34721	Cassia rotundifolia		3.24	10.95*	.30	.35*
49713	Cassia rotundifolia		2.80	10.93*	.26	-.08
52092	Cassia rotundifolia		3.17	11.20	.28	.18
78916	Cassia rotundifolia		3.04	11.10	.27	.10
Q9862	Cassia rotundifolia		2.97	10.38	.28	.38*
55694	Cassia sericea		2.15**	9.47**	.23	-.08
34722	Cassia serpens		3.01	10.61	.28	.33*
83014	Cassia tora		1.93**	7.51**	.26	.30
13407	Chamaecrista fasciculata		3.16	10.63*	.29	.40*
81427	Crotalaria anagyroides		0.03**	3.99**	.01**	-.06
60186	Crotalaria christantiflora		2.64	9.17	.29	.36*
33810	Crotalaria filifolia		-0.05**	4.23**	-.01**	-.24
39530	Crotralaria goreensis		2.30	8.70	.26	.20
27831	Crotalaria grantiana		0.69**	5.66**	.12**	-.05
29452	Crotalaria incana		0.51**	4.68**	.11**	.07
38550	Crotalaria incana		0.10**	3.55**	.03**	.10
39150	Crotalaria incana		1.28**	6.82**	.19**	.08
CQ1101	Crotalaria incana		0.93**	6.49**	.14**	-.14
P4434	Crotalaria laburnifolia		2.84*	10.46	.27	.22
38555	Crotalaria pilosa		-0.22**	4.11**	-.05**	-.36*
52955	Crotalaria rhodesiae		2.18**	10.62	.21*	-.50**
60848	Crotalaria rhodesiae		1.67**	7.66**	.22	.15
CQ1371	Crotalaria senegalensis		2.27**	9.21**	.25	.15

C.P.I.	Species	LWG [g/d]	DMI [g/d]	LWG/DMI [g/g]	O-E
29449	Crotalaria zanzibarica	-0.04**	3.92**	-.01**	-.10
60225	Cyamopsis senegalensis	2.96	7.08**	.41	.15
73595	Dichilus lebeckioides	2.73*	10.63*	.26	-.03
18298	Indigofera antunesiana	2.72*	10.79*	.25	-.11
21018	Indigofera astragalina	3.05	11.09	.28	.19
29065	Indigofera circinella	2.30	8.34*	.28	.34*
CQ1377	Indigofera colutea	2.91	11.79	.25	-.30
13729	Indigofera glandulosa	2.93	10.24	.29	.23
33166	Indigofera hirsuta	3.26	11.30	.29	.32*
40172	Indigofera hirsuta	3.26	11.41	.29	.27
43773	Indigofera hirsuta	3.26	10.78	.30	.52**
82710	Indigofera hirsuta	2.81*	10.60	.27	.15
29981	Indigofera hochstetteri	1.93**	8.62**	.22	.03
CQ3012	Indigofera linnaei	1.23**	7.98**	.15**	-.49**
78907	Indigofera nummulariifolia	2.64	9.61*	.27	.18
21353	Indigofera pilosa	3.09	10.63	.29	.24
79066	Indigofera pumila aff.	0.72**	4.46**	.15**	.28
16055	Indigofera schimperi	1.71**	7.34**	.23	.31
73608	Indigofera schimperi	2.78*	10.58	.26	.11
21019	Indigofera secundiflora	2.75	8.95*	.31	.55**
18421	Indigofera spicata	1.51**	7.47**	.20*	-.11
18422	Indigofera spicata	1.92**	7.82**	.25	.17
29066	Indigofera spicata	1.27**	6.29**	.20*	.11
29485	Indigofera spicata	0.28**	4.23**	.07**	-.07
30216	Indigofera spicata	1.39**	9.30**	.15**	-.85**
32703	Indigofera spicata	0.72**	5.71**	.12**	-.21
32867	Indigofera spicata	0.29**	4.74**	.06**	-.10
37686	Indigofera spicata	2.16*	7.67**	.28	.46**
38211	Indigofera spicata	1.38**	7.05**	.20*	-.08
40545	Indigofera spicata	0.75**	5.70**	.13**	-.18
43774	Indigofera spicata	1.62**	7.26**	.22	.09
37384	Indigofera spicata	-0.06**	5.35**	-.01**	-.76**
37389	Indigofera spicata	0.53**	6.58**	.08**	-.65**
65478	Indigofera spicata	0.38**	6.53**	.06**	-.78**
19577	Indigofera suffruticosa	2.56	9.20	.28	.26
29746	Indigofera suffruticosa	2.82	10.67*	.26	.04
75129	Indigofera suffruticosa	2.62	9.41	.28	.24
Q9846	Indigofera suffruticosa	2.71*	10.47	.26	.09
30154	Indigofera teysmanni	2.48**	10.09*	.25	.01
24207	Indigofera tinctoria	1.98**	9.34**	.21*	-.20
29506	Indigofera tinctoria	2.54*	9.96**	.25	.04
29749	Indigofera tinctoria	2.74*	10.79*	.25	-.08
32973	Indigofera tinctoria	2.29**	9.35**	.25	.11
71068	Indigofera tinctoria	2.39**	9.75**	.25	.05
30064	Indigofera trifoliata	2.66	9.28	.29	.33*
29630	Indigofera trita	2.73	9.13	.30	.47**
69494	Indigofera vicioides	2.68*	10.16**	.26	.11
69497	Indigofera vicioides	2.99	9.68	.31	.51**
32866	Indigofera volkensii	2.49	8.92	.28	.31
29996	Mimosa pigra	3.04	11.18	.27	.06
40765	Tephrosia bracteolata	1.08**	7.02**	.15**	-.20
79673	Tephrosia cathartica	0.05**	3.78**	.02**	.05
35021	Tephrosia cuneata	1.79**	7.18**	.25	.38*

C.P.I.	Species	LWG [g/d]	DMI [g/d]	LWG/DMI [g/g]	O-E
32868	Tephrosia holstii	-0.14**	3.12**	-.05**	-.05
30140	Tephrosia noctiflora	0.19**	4.20**	.04**	-.07
36384	Tephrosia noctiflora	0.33**	4.54**	.07**	-.05
53263	Tephrosia noctiflora	1.88**	8.68**	.21*	-.12
53680	Tephrosia noctiflora	0.43**	4.37**	.10**	.11
Q8257	Tephrosia noctiflora	0.05**	4.41**	.01**	-.21
71071	Tephrosia polystachya	2.27**	9.06**	.25	.20
29857	Tephrosia purpurea	0.38**	4.64**	.08**	-.04
36435	Tephrosia purpurea	1.32**	6.51**	.20*	.24
36720	Tephrosia purpurea	2.13**	9.56**	.22	-.14
53566	Tephrosia purpurea	1.73**	8.59	.20*	-.32*
53681	Tephrosia purpurea	-0.14**	3.60**	-.04**	-.08
69505	Tephrosia purpurea	2.66*	9.02**	.29	.53**
71070	Tephrosia purpurea	1.87**	8.61**	.22*	-.10
69505A	Tephrosia purpurea	-2.42**	2.16**	-1.95**	-1.79**
18427	Tephrosia radicans	2.37**	9.18**	.26	.18
71929	Tephrosia subtriflora	0.64**	4.99**	.13**	.17
34121	Tephrosia villosa	0.28**	3.82**	.07**	.08

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*, ** = different from control [autoclaved soybean seed] at P=0.05 and 0.01 respectively.