



**Diet selection and browsing
impact in a re-introduced black
rhino population**

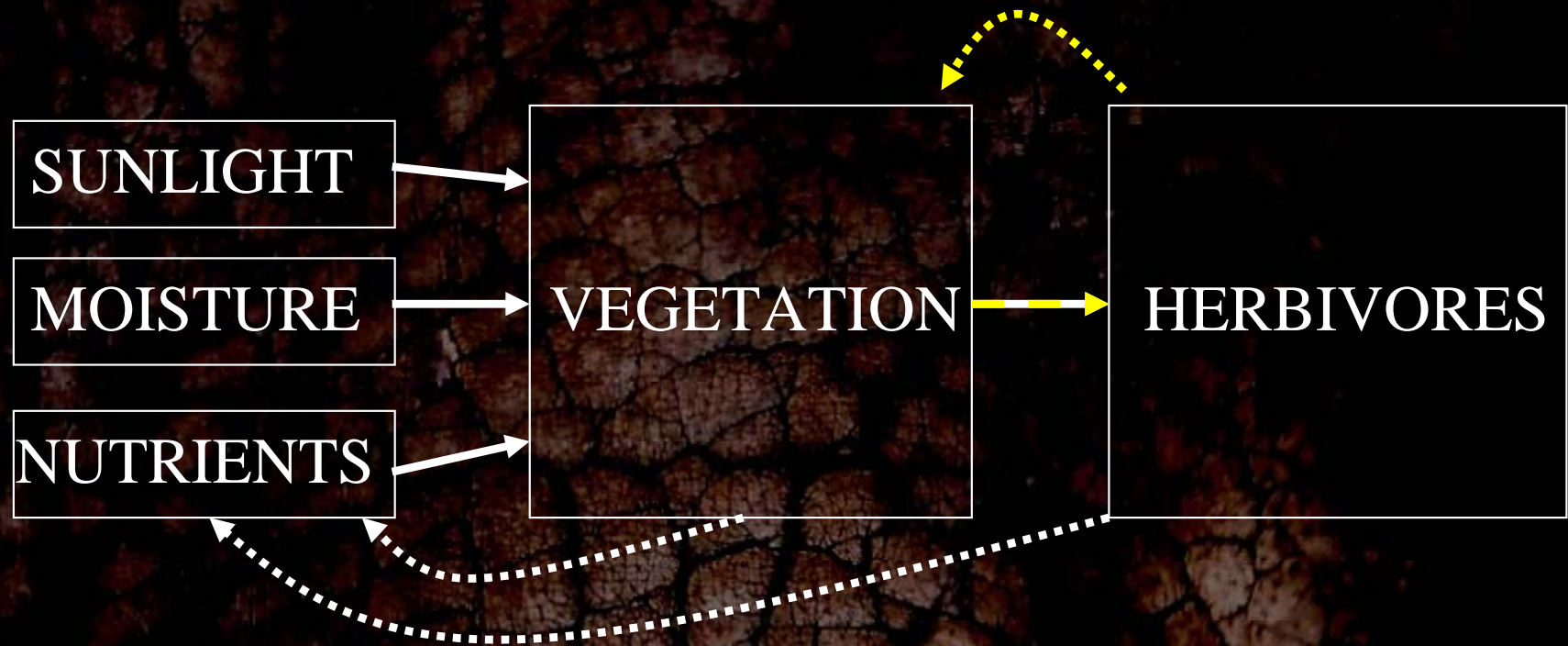
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Plant-herbivore dynamics



Compensatory growth

Study site

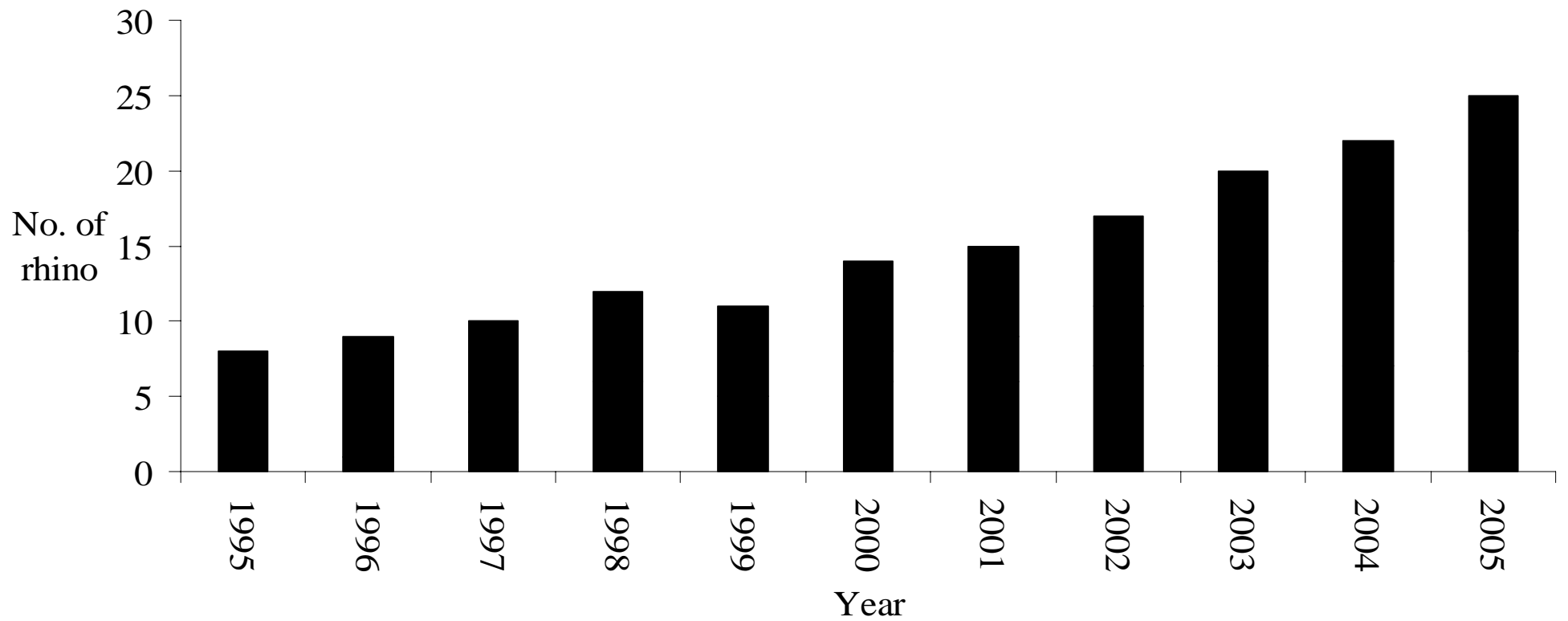
Tswalu Kalahari Reserve in the Northern Cape, South Africa.

Mean annual rainfall 280 ± 164 mm

Predominant vegetation type is Shrubby Kalahari Dune Bushveld

Acacia haematoxylon





Tswalu has the largest population of *Diceros bicornis bicornis* on private land in South Africa.

Black rhino home ranges and density

<u>Location</u>	<u>Mean size (km²) (95% MCP)</u>
Hluhluwe	6.7
Great Fish River	11.7
Ngorongoro	31.5
Olduvai	36.0
Serengeti	75.5
<i>Tswalu</i>	79.7
Damaraland	385.9





Use

Plant species

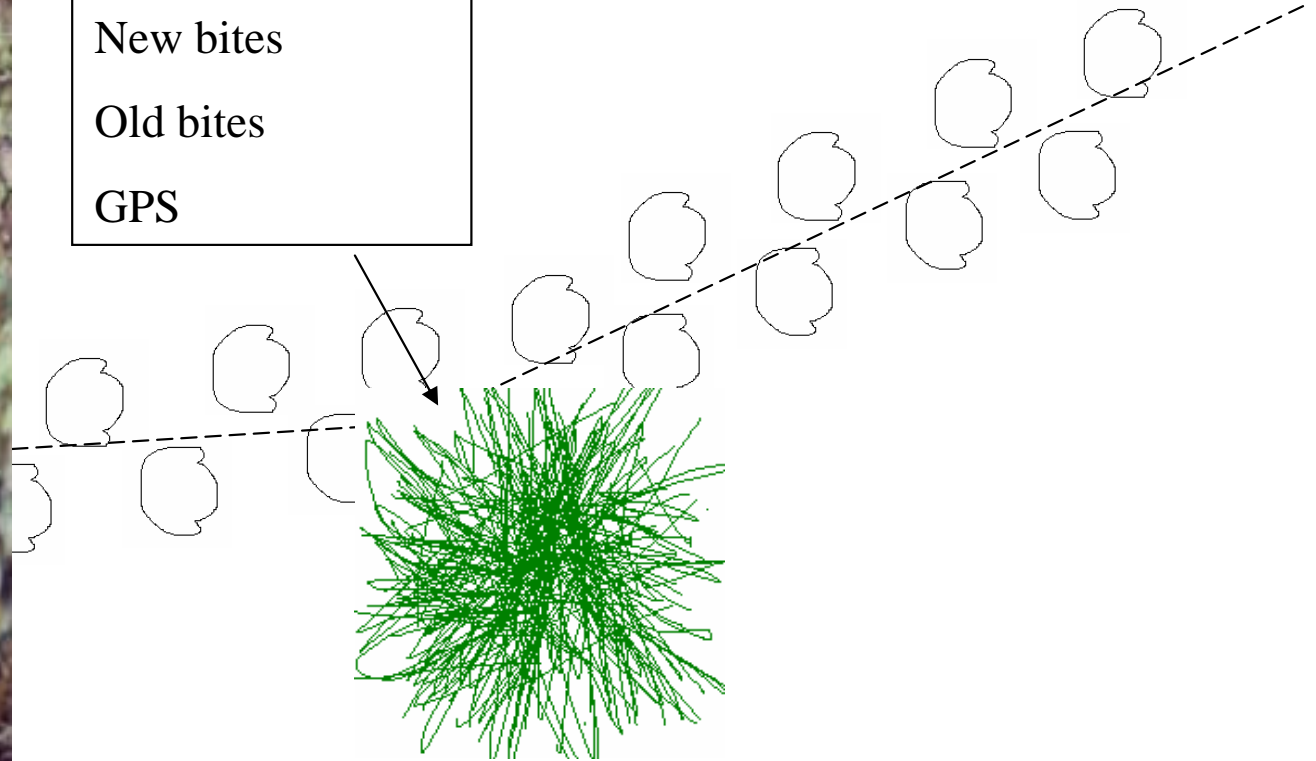
Size

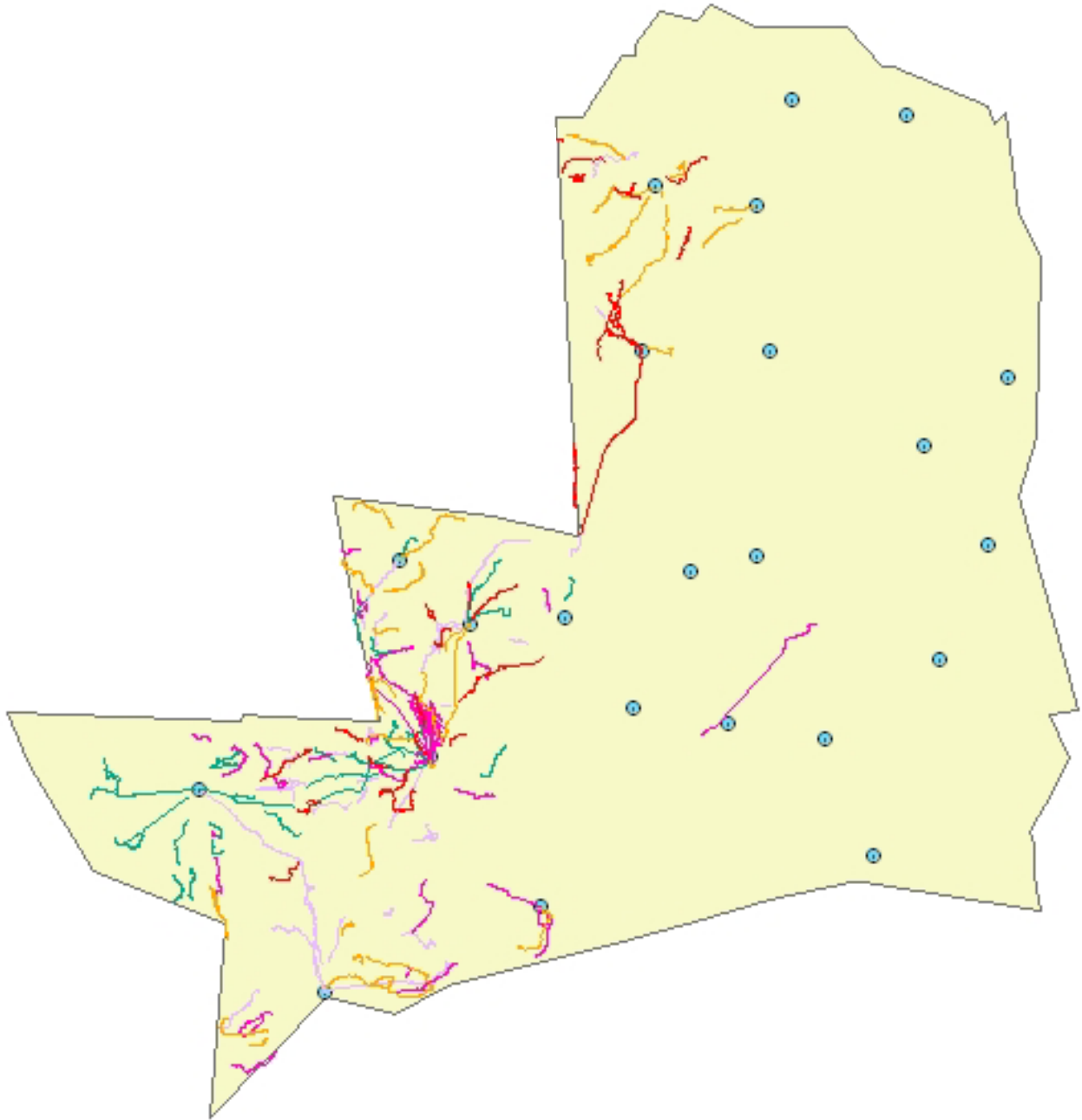
Leaf phenology

New bites

Old bites

GPS



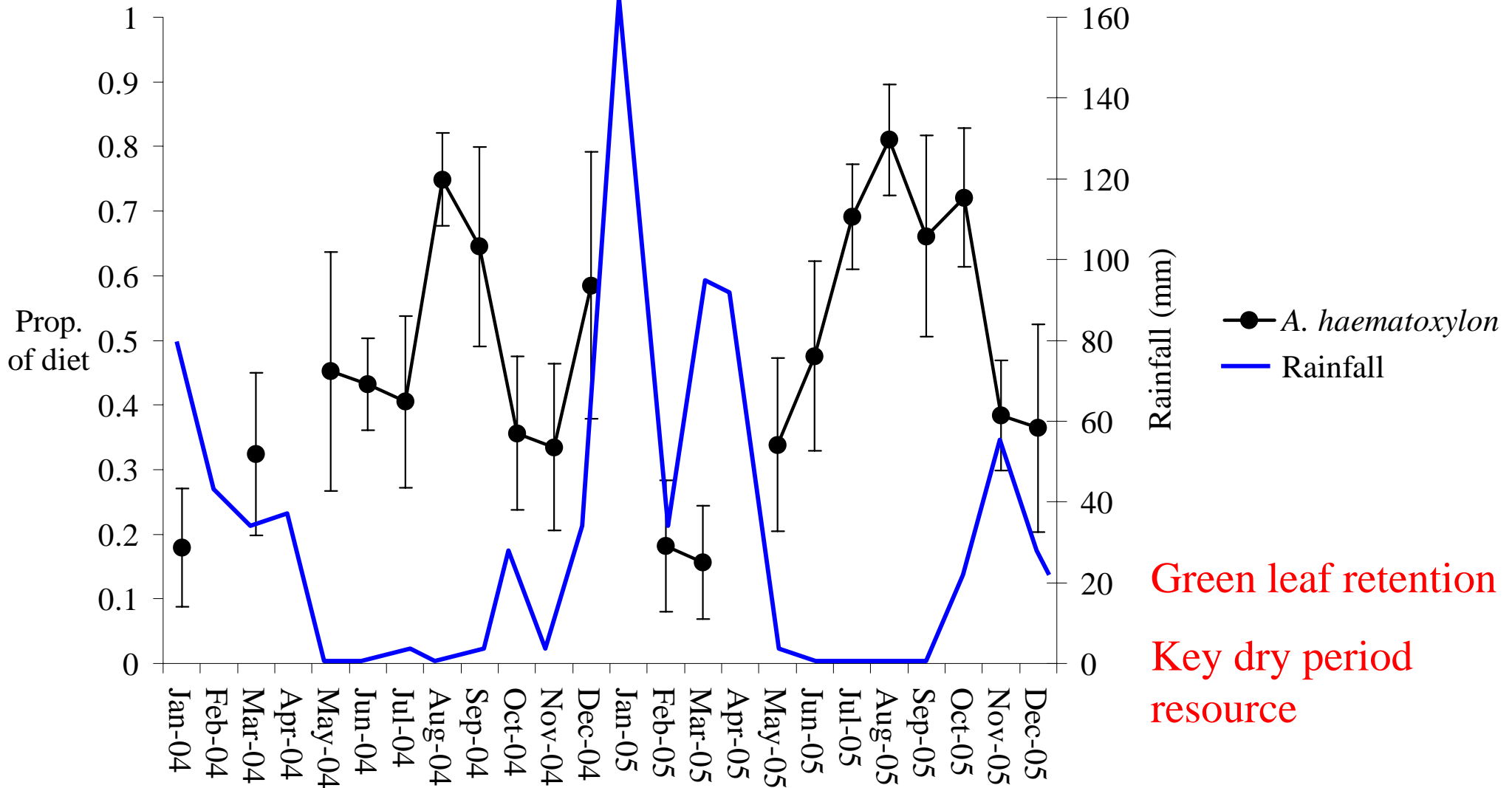


Diet selection

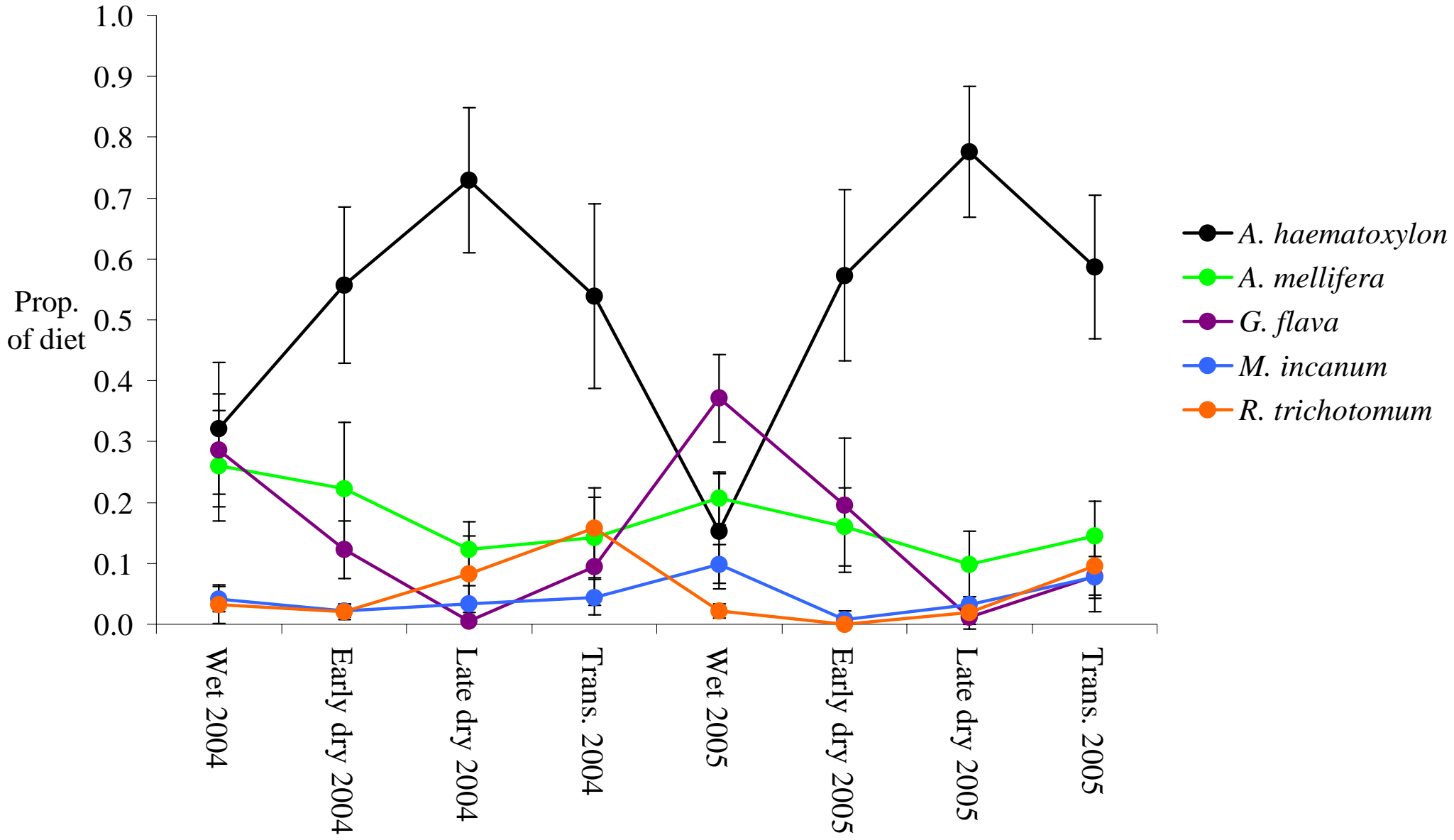
Five plant species contributed 95%

	%	<u>Cumulative total</u>
<i>Acacia haematoxylon</i>	55	55
<i>Acacia mellifera</i>	17	72
<i>Grewia flava</i>	14	86
<i>Rhigozum trichotomum</i>	5	91
<i>Monechma incanum</i>	4	95
<i>Lycium cinerum</i>	1	96
<i>Lycium hirsutum</i>	1	97
Other	3	100

Proportion of *A. haematoxylon* in rhino diet at Tswalu



Proportion of major woody plant species in rhino diet



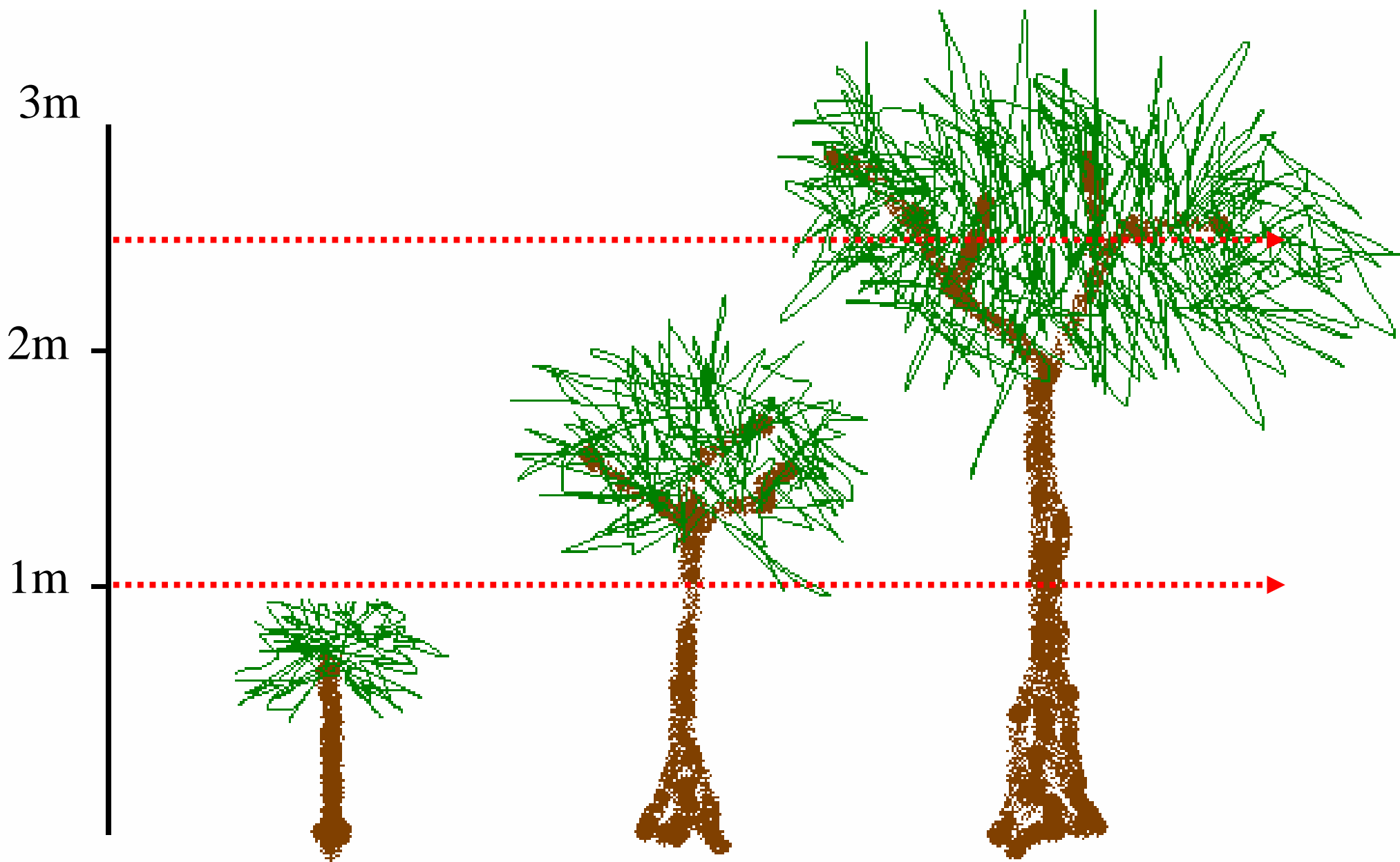
Effect of browsers on habitat resources.

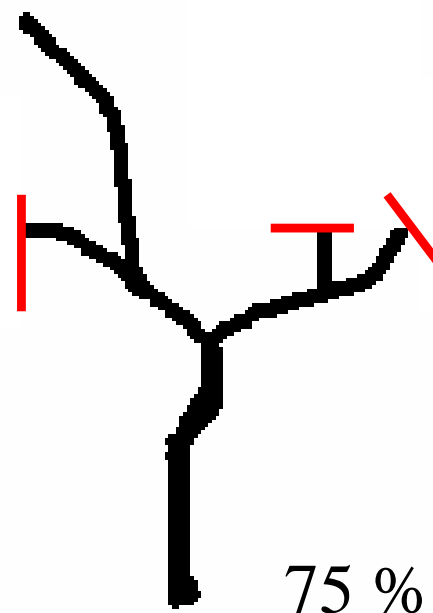
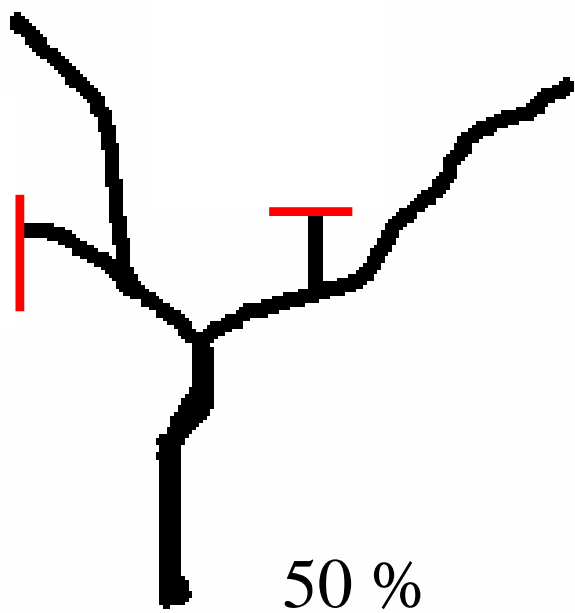
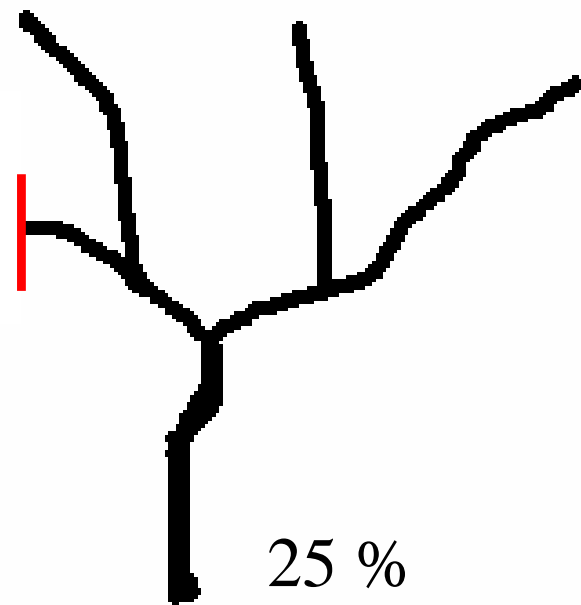
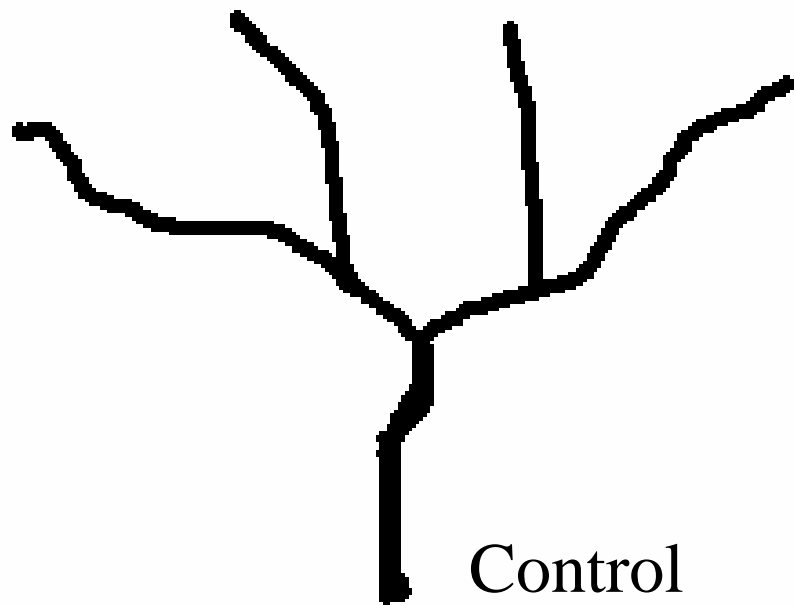
Giraffes in Ithala Game Reserve (Bond and Loffell, 2001).

Re-introduced black rhino at Addo Elephant National Park (Hall-Martin *et al.*, 1982) and Solio Ranch in Kenya (Brett, 2001).



We designed an experiment to simulate different levels of browsing pressure on *A. haematoxylon*



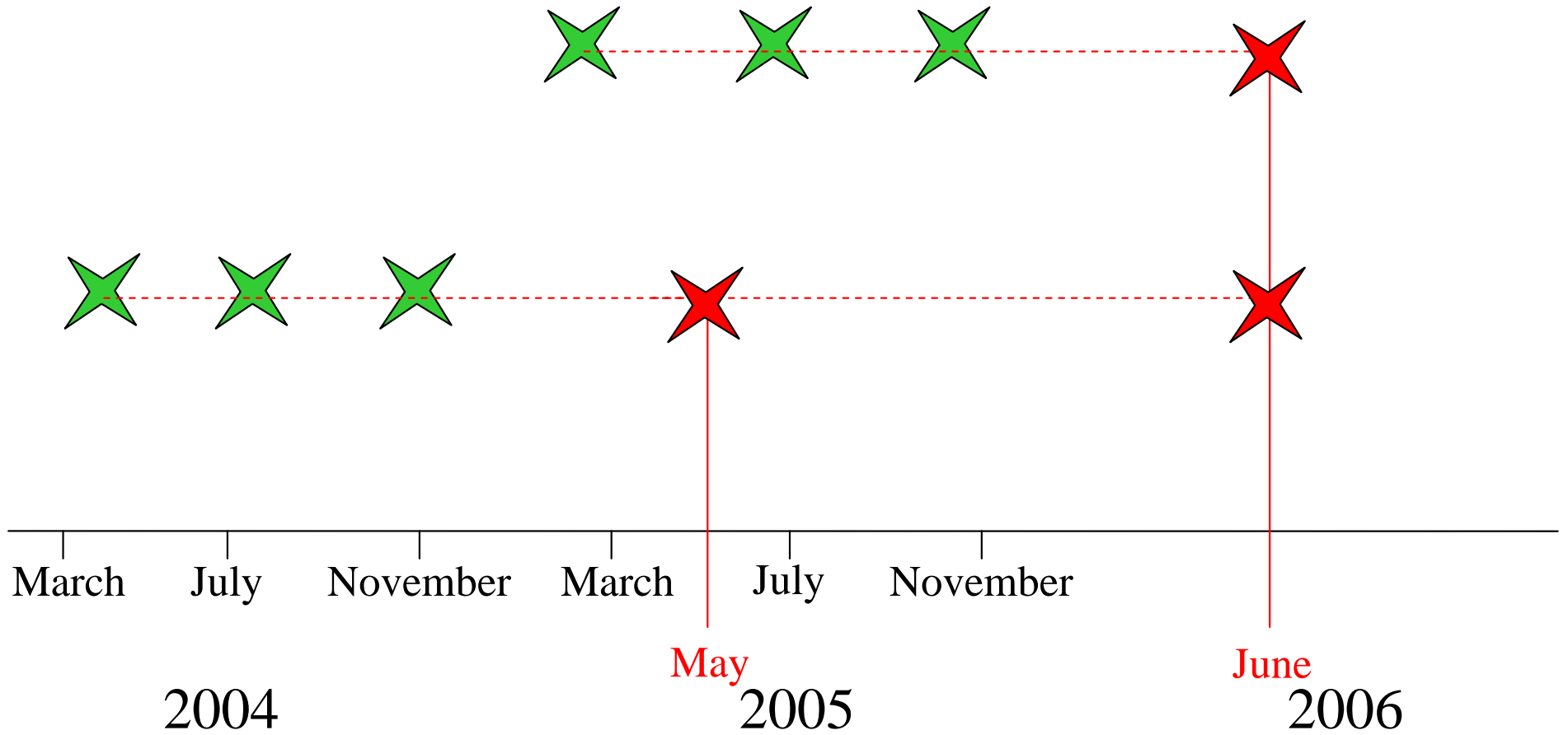


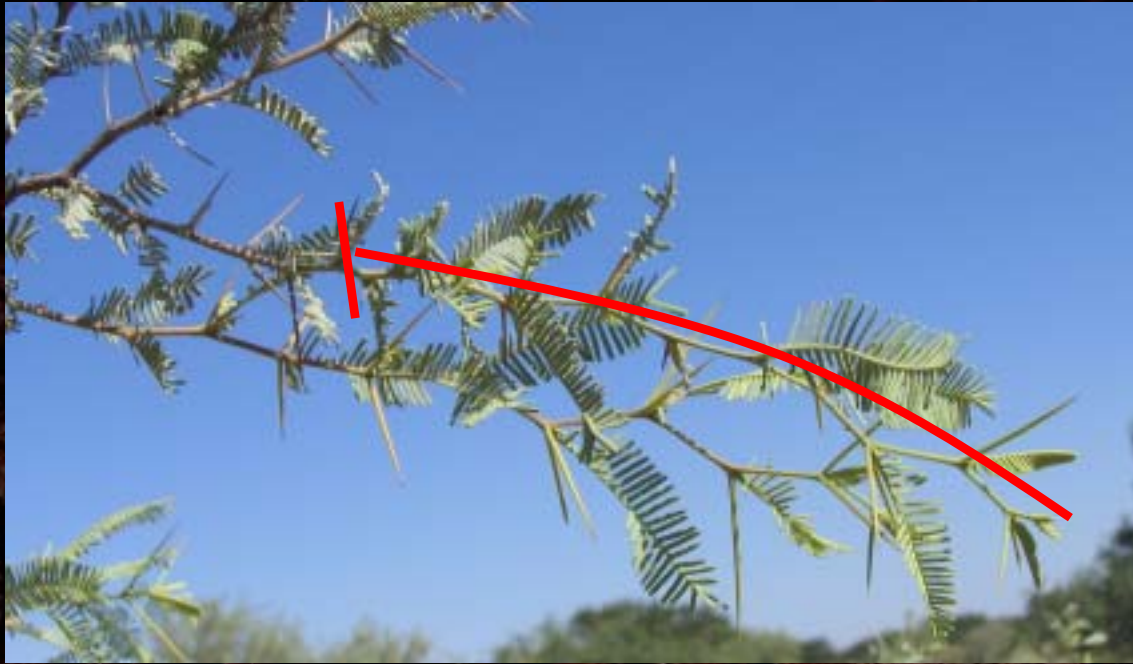


Pruning



Measurement



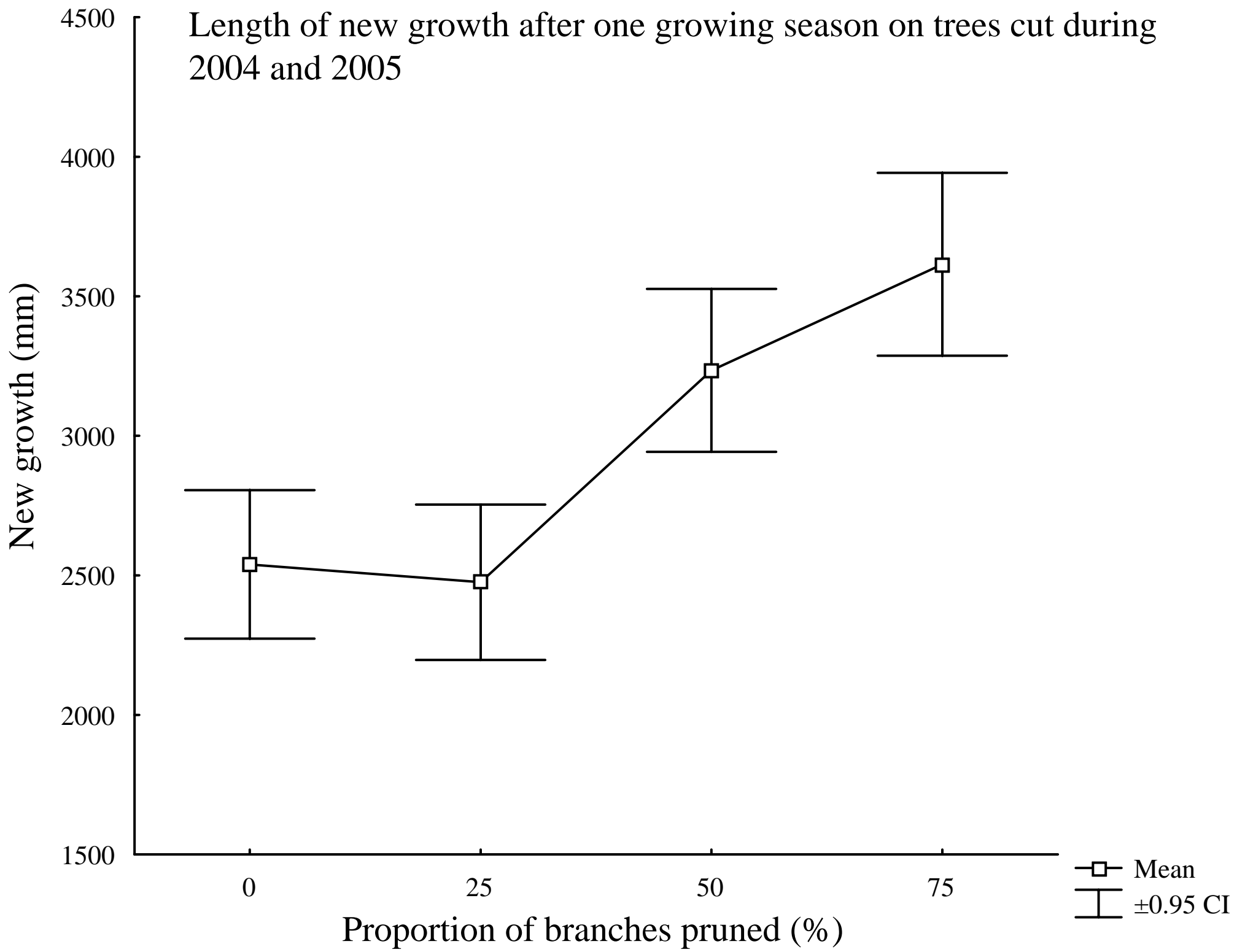


New annual growth



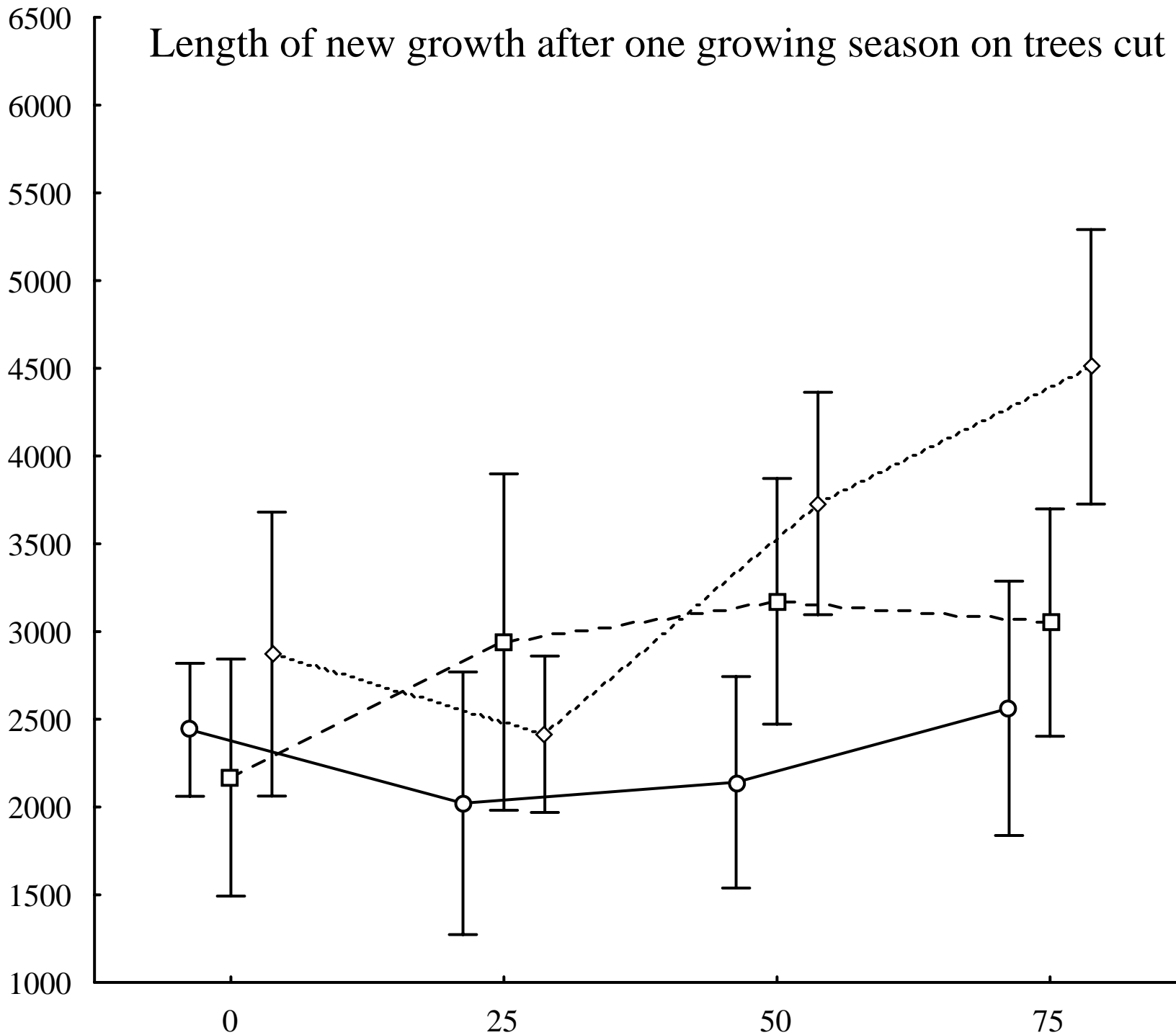
Epicormic resprouts

Length of new growth after one growing season on trees cut during 2004 and 2005



Length of new growth after one growing season on trees cut during 2004

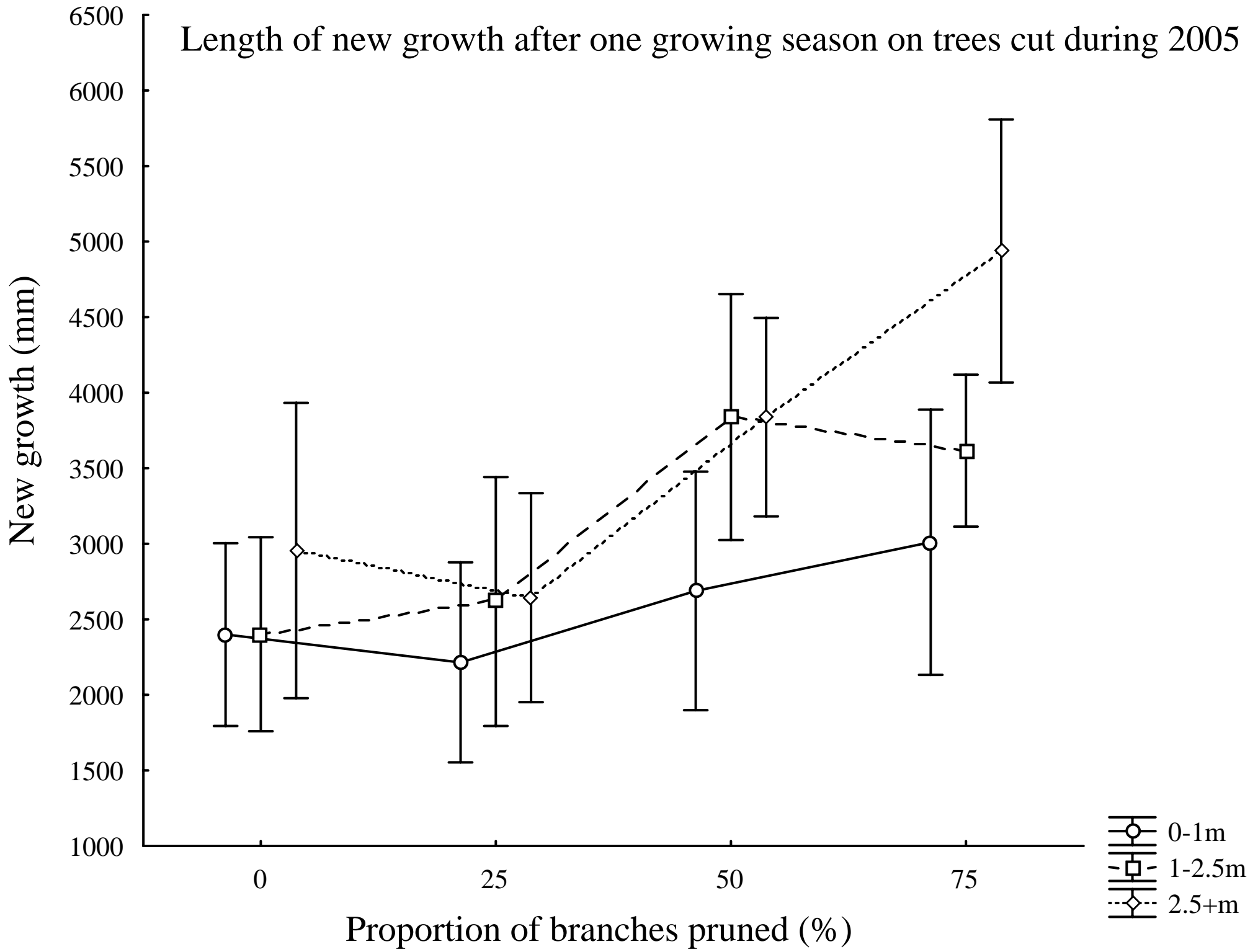
New growth (mm)



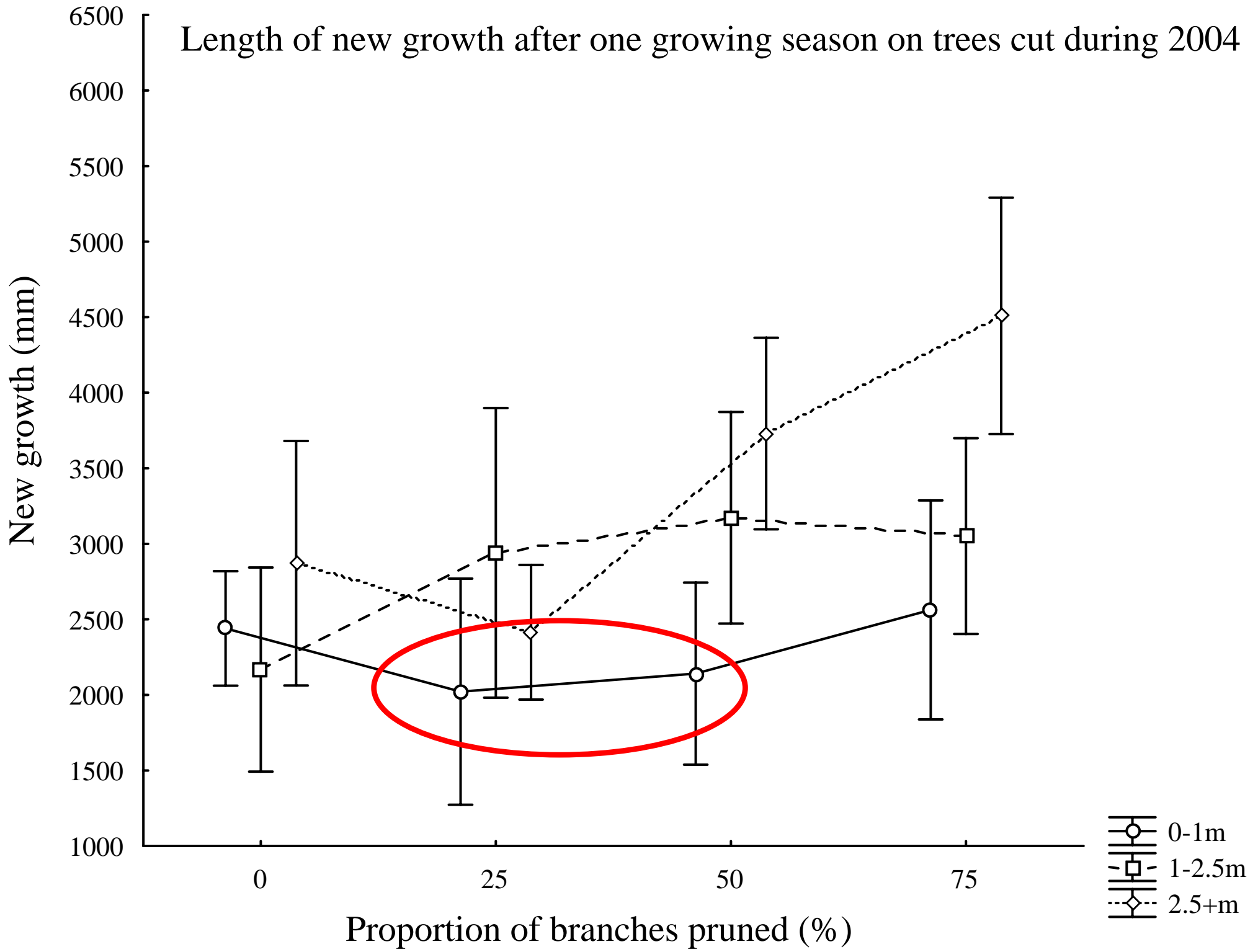
Proportion of branches pruned (%)

- 0-1m
- 1-2.5m
- 2.5+m

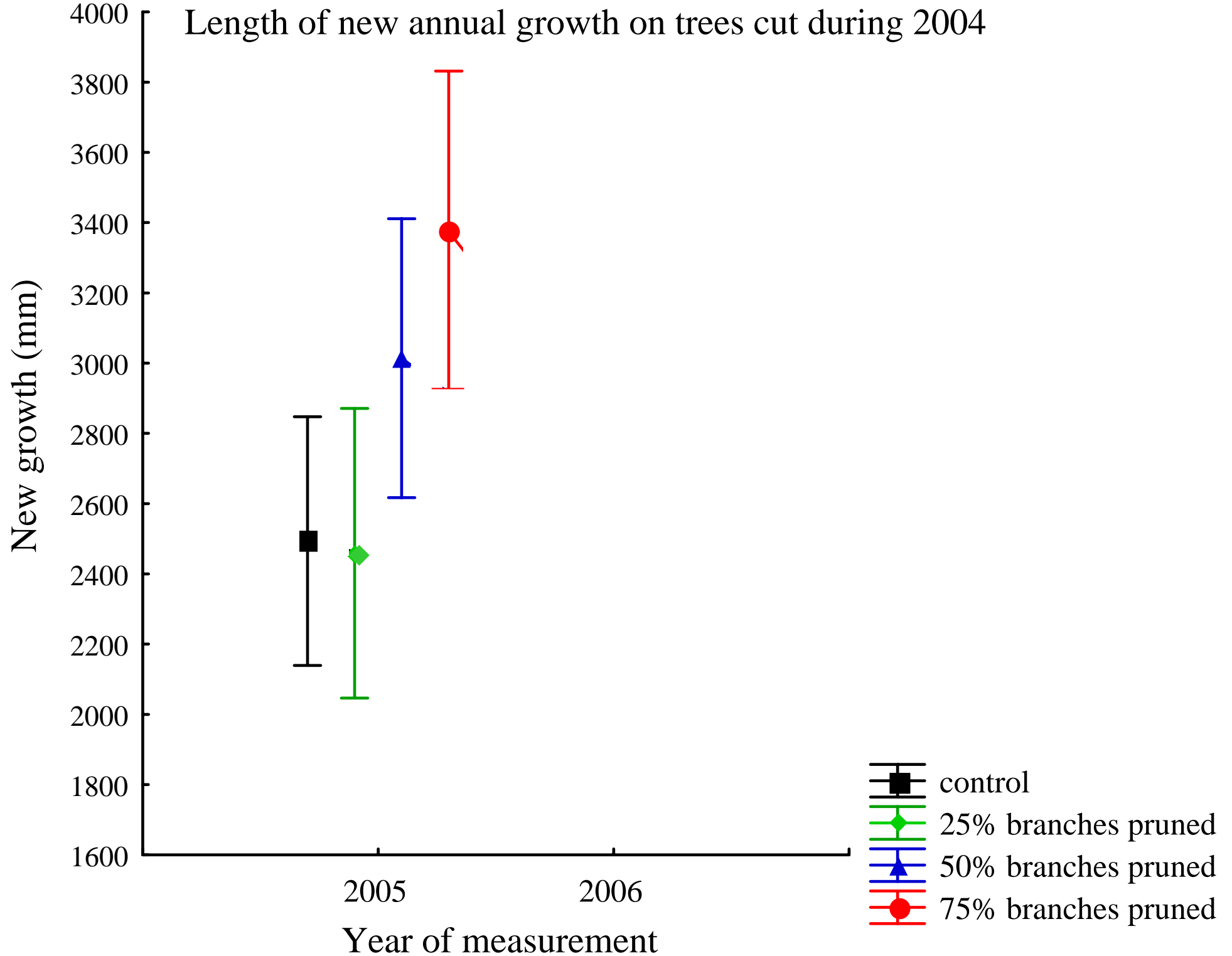
Length of new growth after one growing season on trees cut during 2005



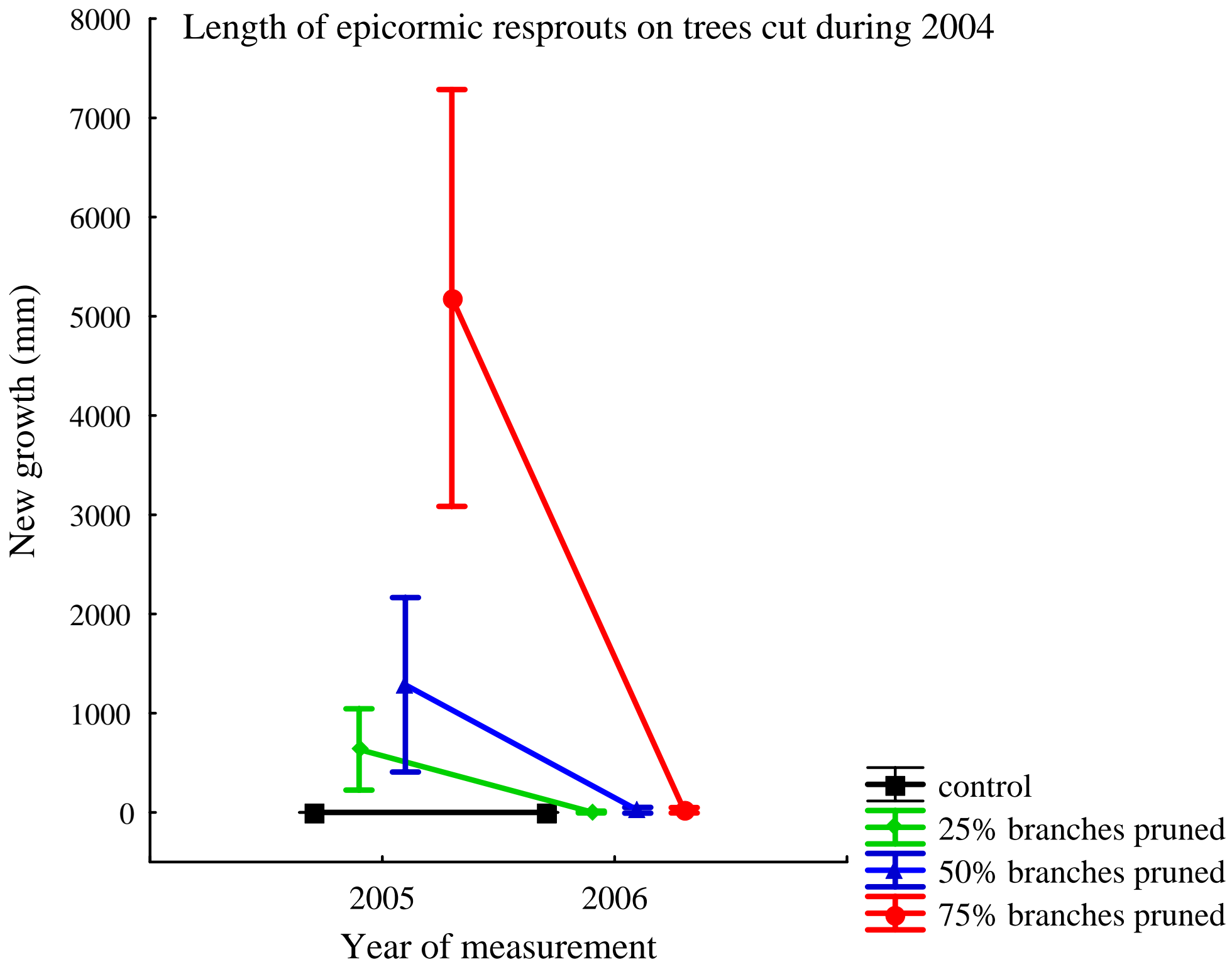
Length of new growth after one growing season on trees cut during 2004



Length of new annual growth on trees cut during 2004



Length of epicormic resprouts on trees cut during 2004



Conclusions



Black rhino population at Tswalu is increasing rapidly.

A. haematoxylon is a key dietary resource, particularly during the dry periods.

Simulated browsing on *A. haematoxylon* stimulated compensatory growth.

Long-term;

- Abiotic resource levels for plants
- Frequency of clipping
- Browse quality – physical and chemical defence

At present rhino density trees appear able to cope, but as the population density changes so will the browsing pressure and it is difficult to predict how the trees will respond.



Need to consider long-term effects of browsing herbivore impacts on vegetation when making assessments of their habitat capacity.



This research is supported by Tswalu Kalahari Reserve, the University of the Witwatersrand and Save the Rhino International.

