

**Impact of uncontrolled bark harvesting
on the resource base**

Part 2:

**Using market information to assess the
condition of the resource**

Vivienne L. Williams

- Medicines derived from savanna and forests are the most prevalent resources sold in medicinal plant markets in South Africa;
- For every tonne of plants harvested/sold in the Johannesburg markets,
 - \pm 630 kg are derived from woodlands/forests
 - 320 kg from grasslands
- 67% of the revenues are derived from woodlands/forest and 26% from grasslands;
- Bark medicines account for \pm 33% of the plant part products

- **Estimated mass traded through the markets informs magnitude of resource depletion**
 - difficult to use these figures to assess the condition of the resource
- **If one could translate records of bark thicknesses sold in the markets into**
 - size of trees targeted by harvesters
 - potential population structures
 - then temporal changes in resource availability could be assessed
- **Estimating the number of trees debarked and extent of damage to wild populations**
 - useful for knowing the scale of cultivation required to replace harvested stocks

- Started research in 1998 to use market information to assess the resource condition
 - establish relationship between bark thickness and stem diameter
 - estimate mean bark mass per tree for:
 - *Warburgia salutaris*
 - *Albizia adianthifolia*
 - *Elaeodendron transvaalense*
 - *Acacia xanthophloea*
 - *Rhus chirindensis*
 - *Balanites maughamii*



Eleaodendron transvaalense

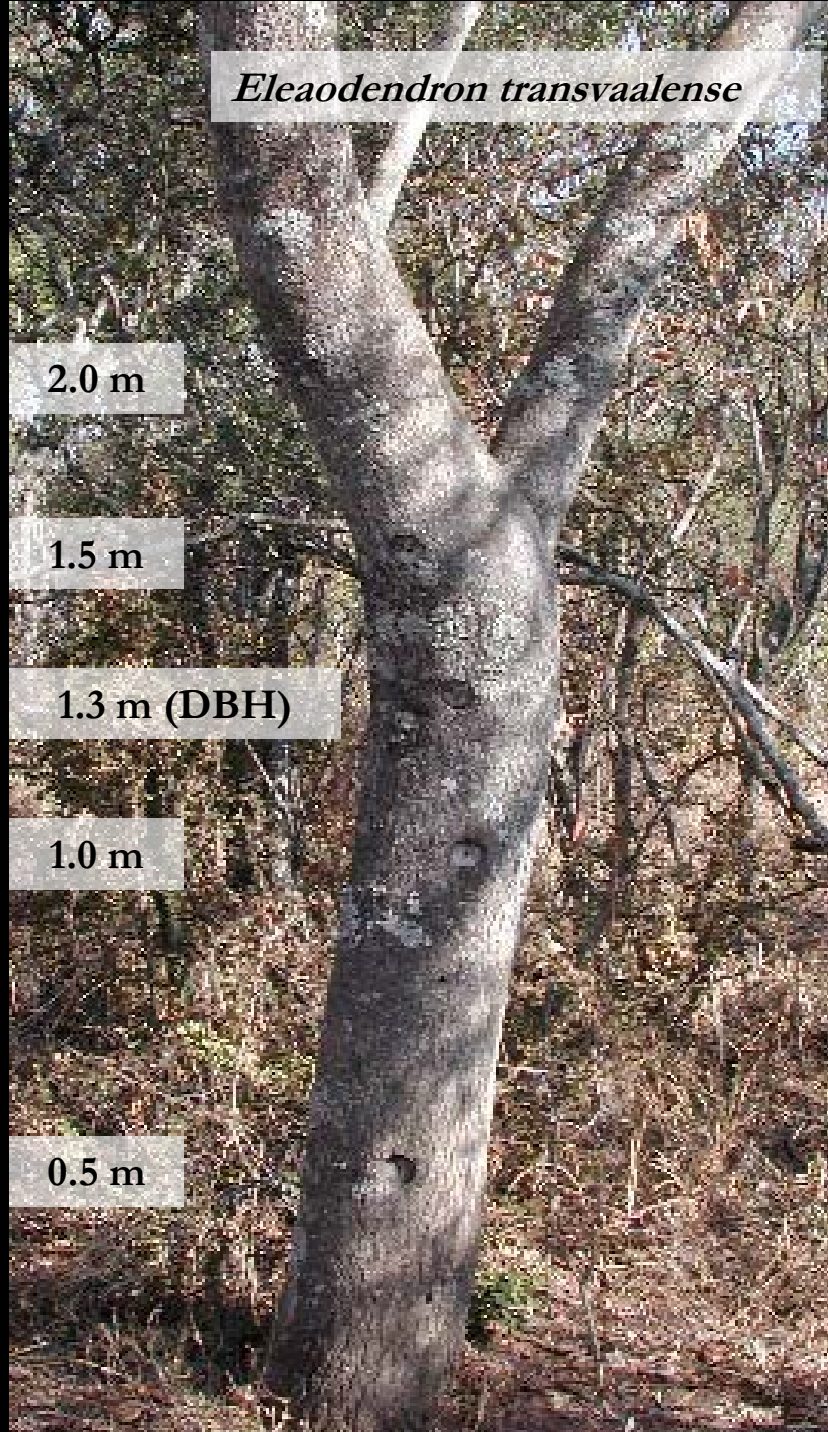
2.0 m

1.5 m

1.3 m (DBH)

1.0 m

0.5 m





Elaeodendron transvaalense

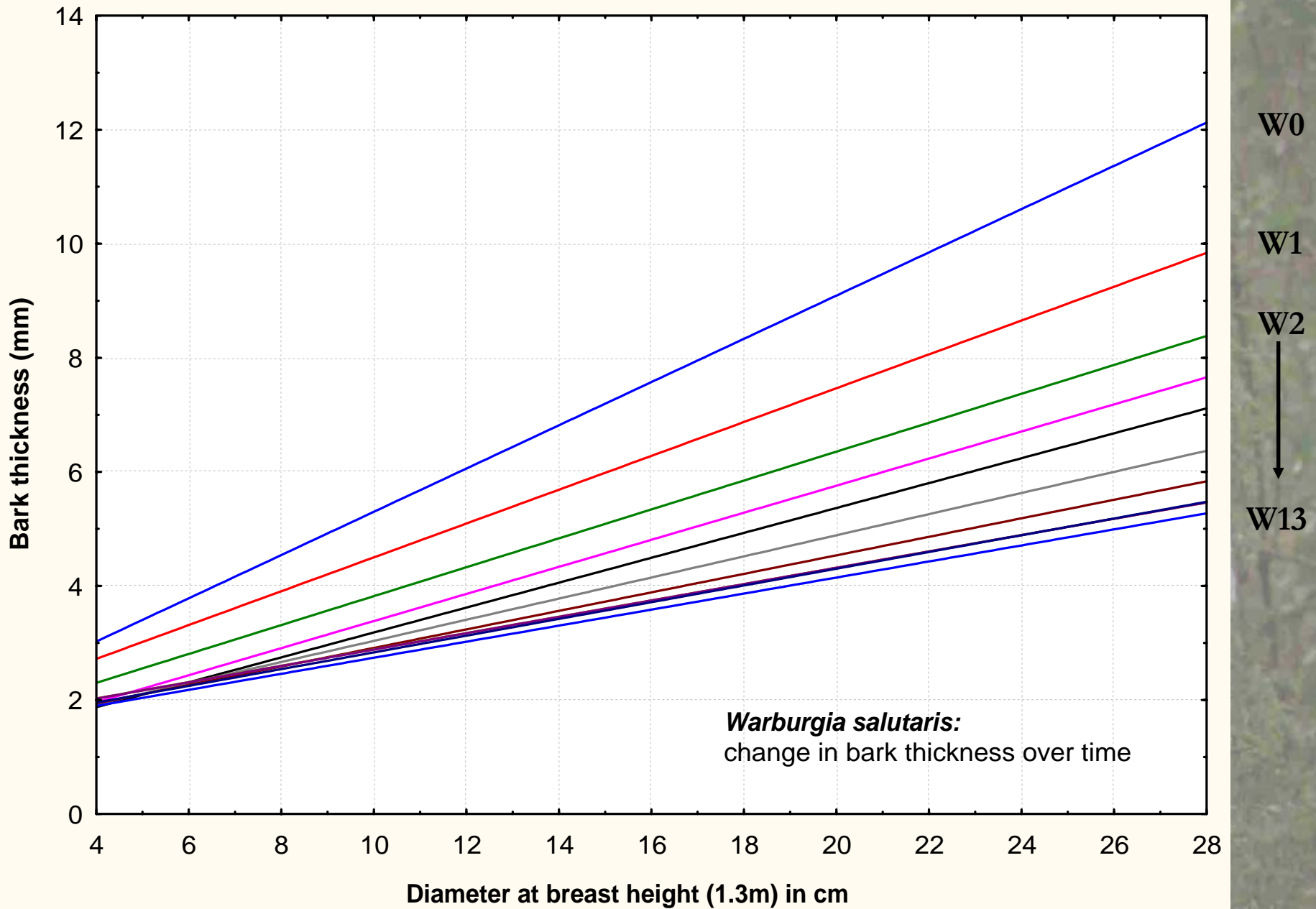
- From a study in 2001:
 - species was 3rd in availability
 - 48% of street traders sold it
- ± 16 sacks ≈ 800 kg
- Species very vulnerable to harvesting – slow growth rate and bark regrowth

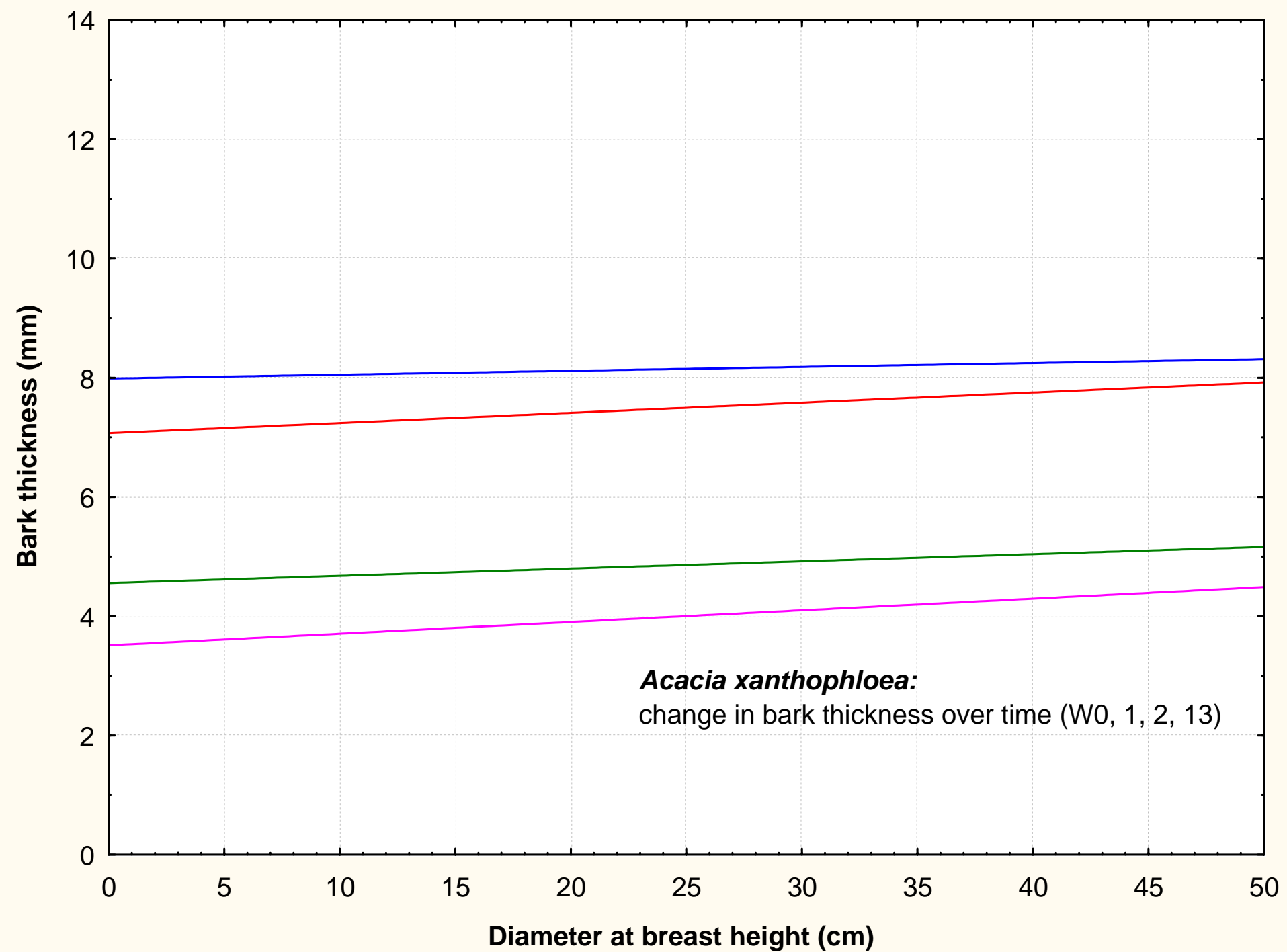


Warburgia salutaris

- Scarcity → reduced availability (21% of traders)
- Mostly harvested from Mozambique (currently)
- ± 5 sacks ≈ 244 kg
- High risk species

Bark thickness versus DBH





Bark thickness (mm) vs. time (weeks) to predict tree DBH (cm)
Warburgia salutaris

Bark thickness (mm)	W0	W1	W2	W3	W4	W5	W6	W11	W12	W13
	On site									
1	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2	<2	<2	2.8	4.2	4.6	4.4	4.4	3.8	4.3	4.7
3	3.9	4.9	6.8	8.4	9.2	9.8	10.5	10.8	11.1	11.8
4	6.6	8.3	10.7	12.6	13.7	15.2	16.7	17.8	17.9	18.9
5	9.2	11.7	14.7	16.8	18.3	20.6	22.9	24.8	24.8	26.1
6	11.8	15.1	18.6	21.0	22.9	26.0	29.0	31.7	31.6	33.2
7	14.5	18.4	22.5	25.2	27.5	31.4	35.2	38.7	38.4	40.3
8	17.1	21.8	26.5	29.4	32.1	36.8	41.3	45.7	45.2	47.4
9	19.8	25.2	30.4	33.7	36.6	42.2	47.5	52.7	52.0	54.5
10	22.4	28.5	34.4	37.9	41.2	47.6	53.7	59.7	58.8	61.6

Warburgia salutaris

DBH

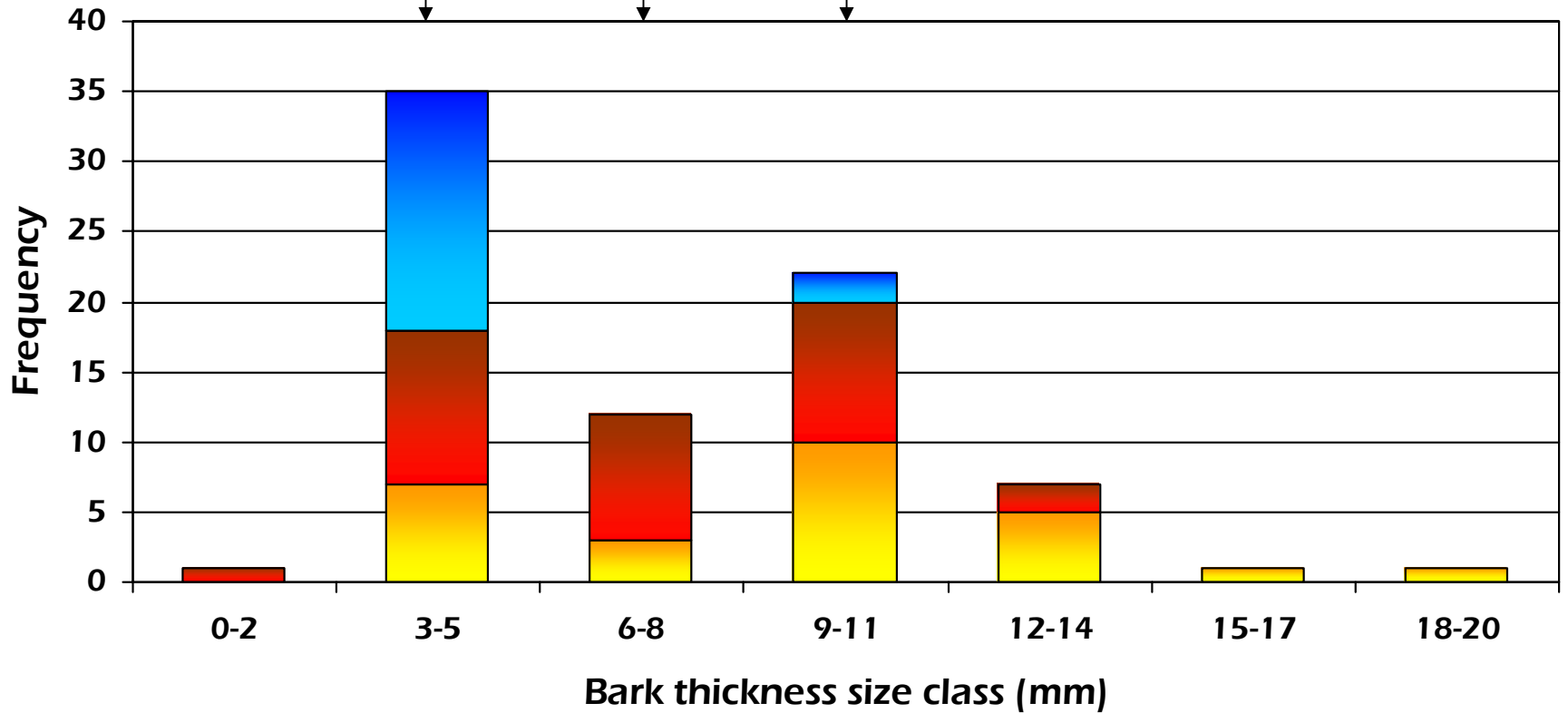
3 cm –
12 cm

10 cm –
22 cm

18 cm –
32 cm



Assuming bark is ± 1
week old and
harvested between 0.5
– 1.3 m on stem



■ Muti shops 1995 ■ Faraday 1996 ■ Faraday 2001

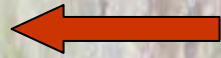
Warburgia salutaris

DBH

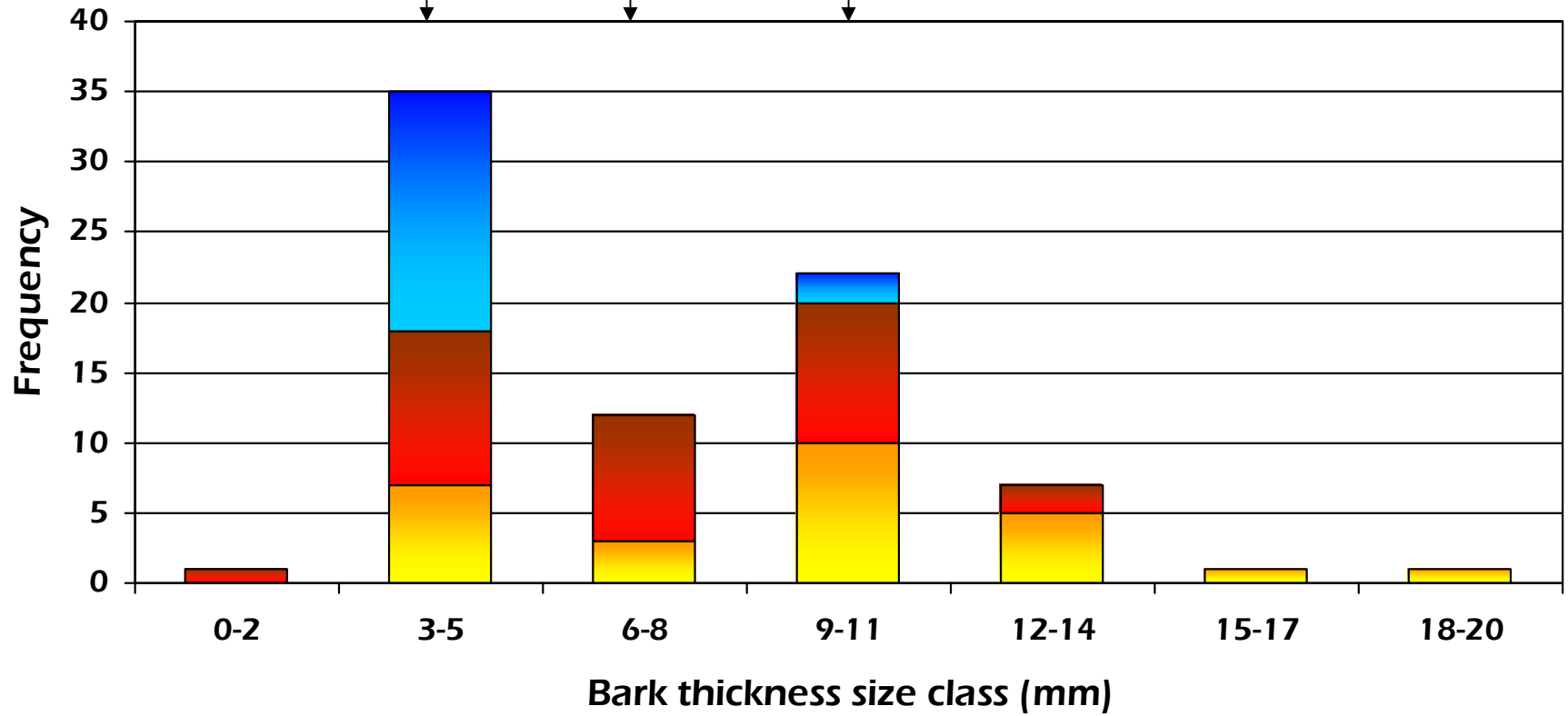
9 cm –
23 cm

26 cm –
41 cm

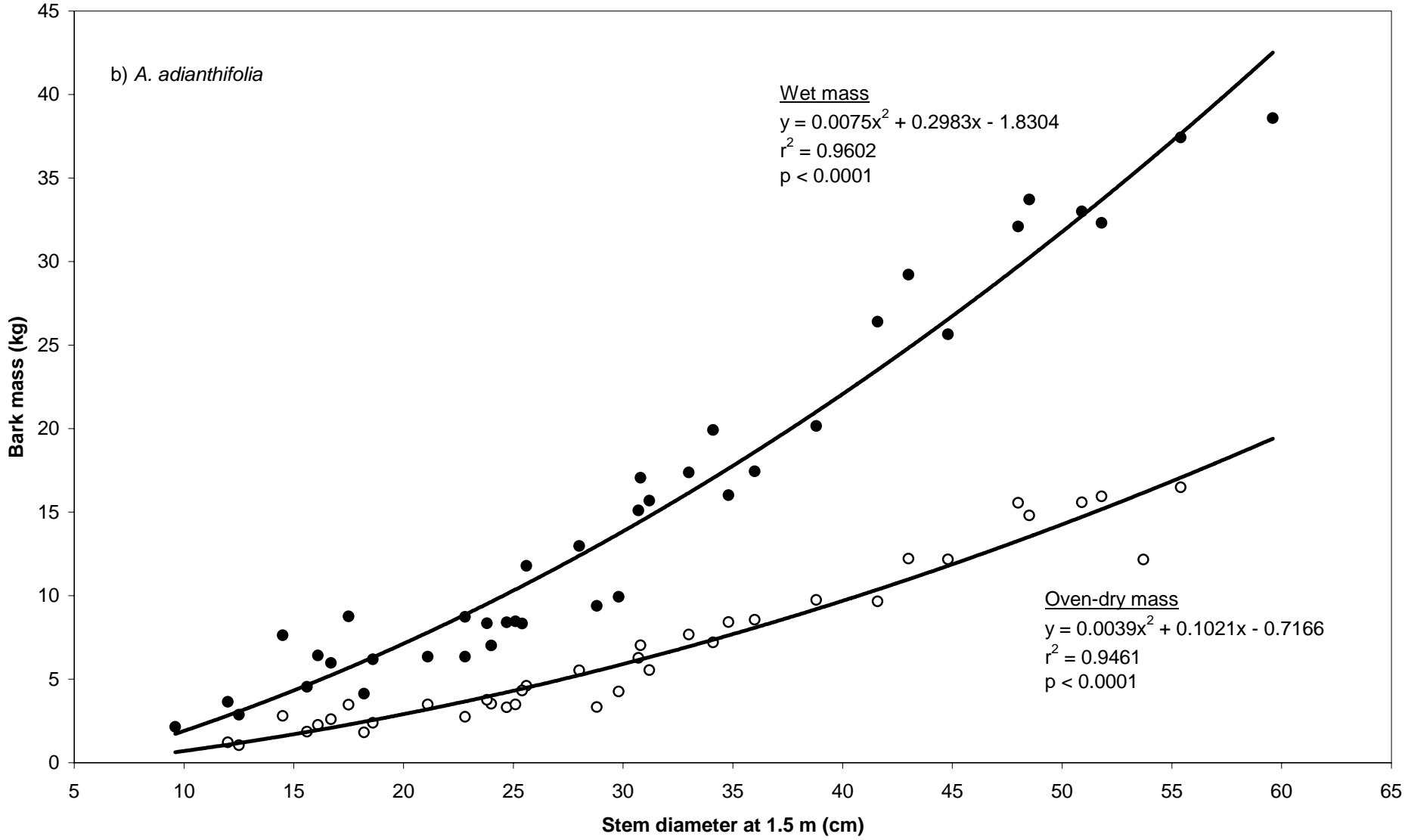
42 cm –
60 cm



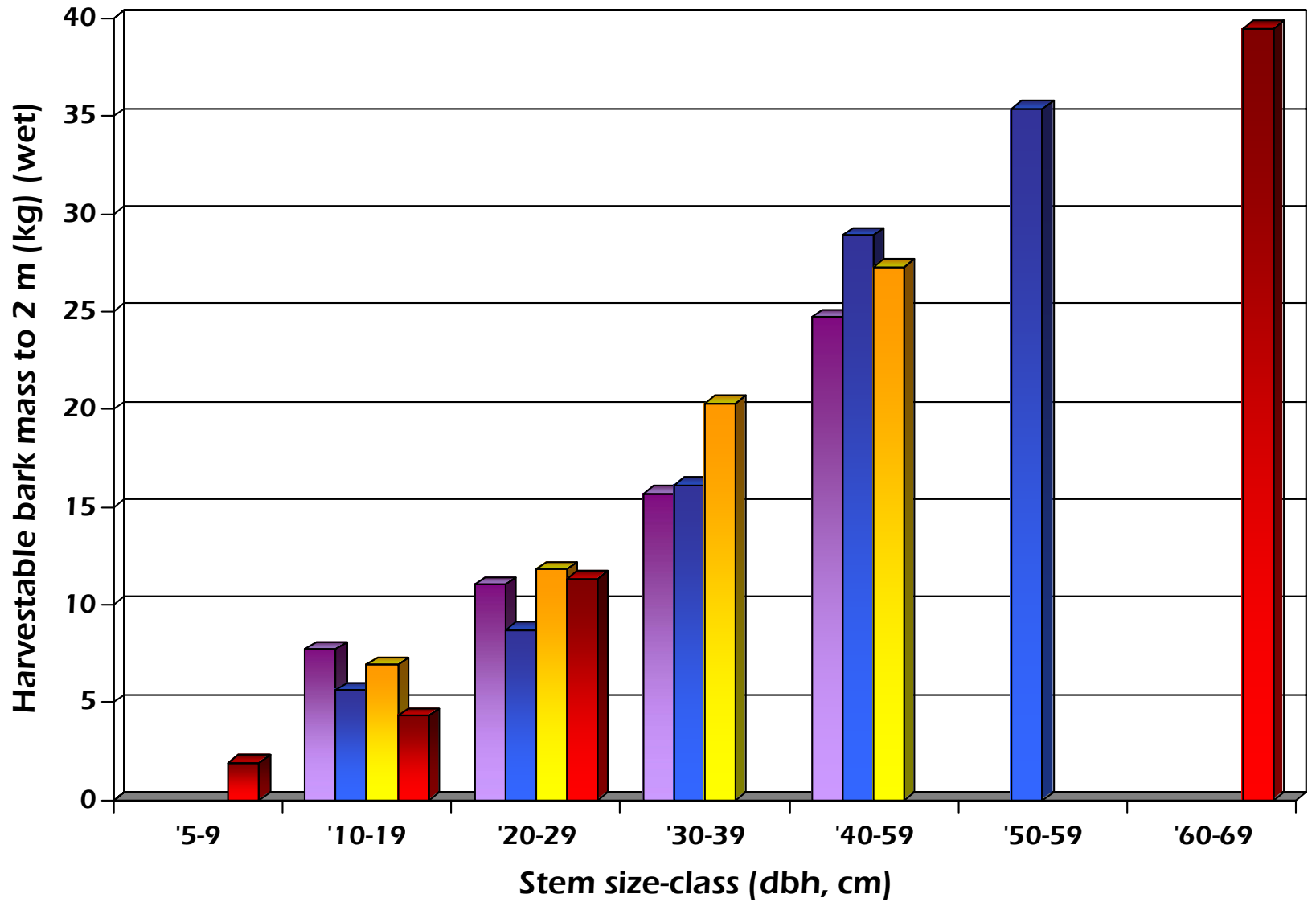
Assuming bark is \pm
6 weeks old and
harvested between
0.5 – 1.3 m on stem



■ Muti shops 1995 ■ Faraday 1996 ■ Faraday 2001



Harvestable bark mass versus size-class (wet mass)



Acacia

Albizia

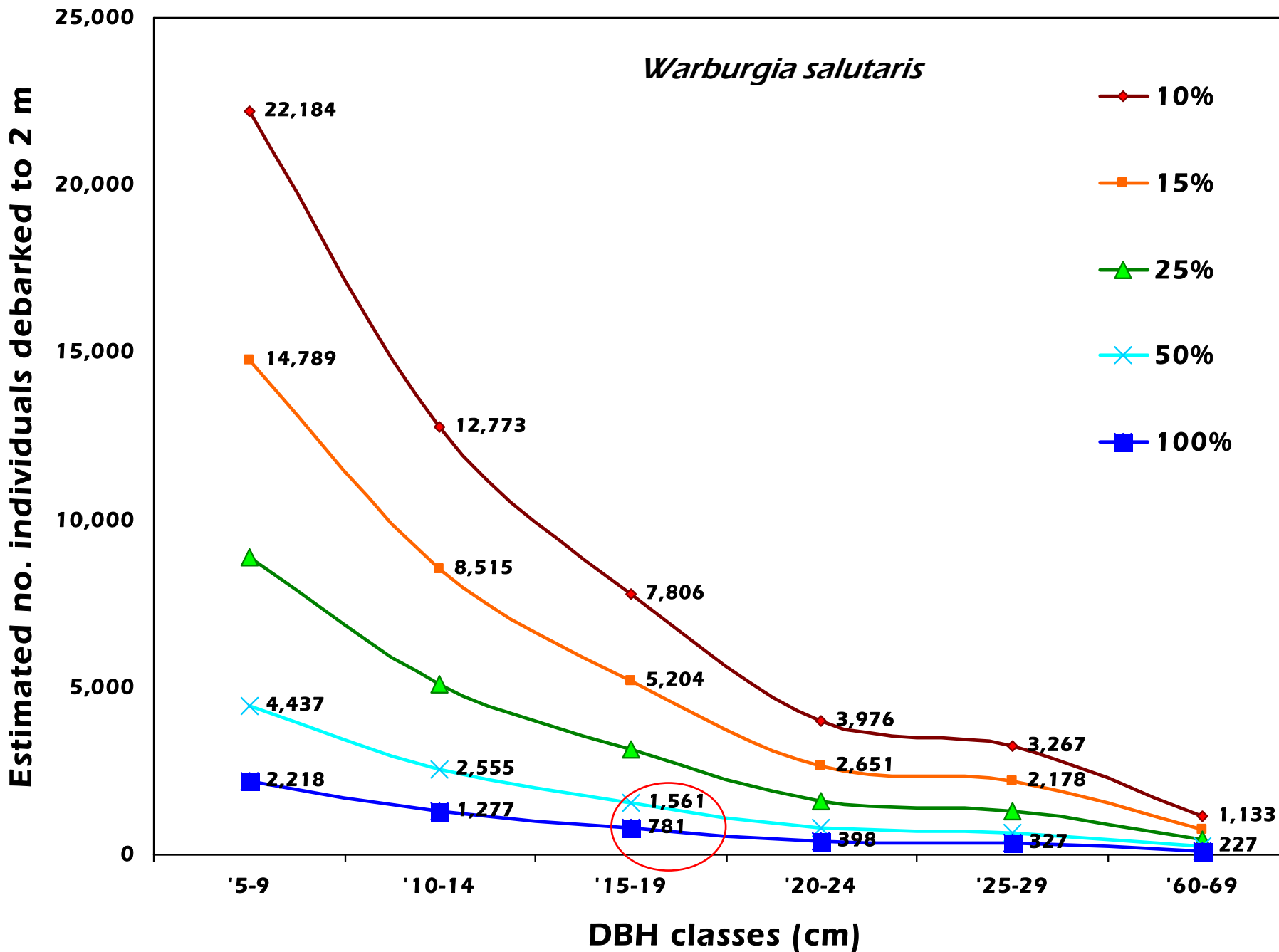
Elaeodendron

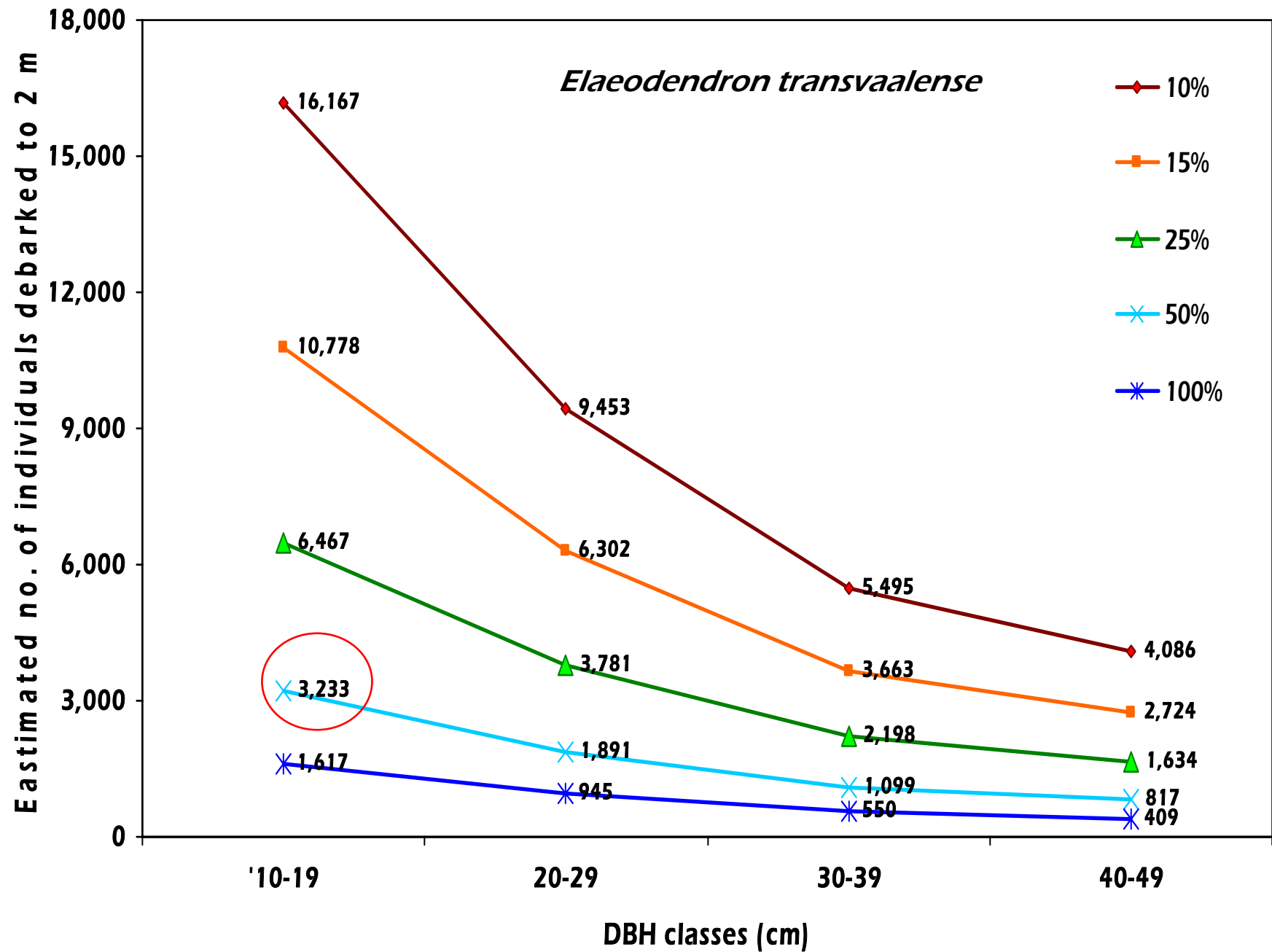
Warburgia

The most prevalent stem diameter size-classes sold in the markets in 1995 and 2001 – estimated from bark thickness records and regressions

Species	Muti shops 1995	Faraday 2001
<i>Albizia adianthifolia</i>	50 – 59 cm	20 – 29 cm
<i>Balanites maughamii</i>	60 – 69 cm	40 – 49 cm
<i>Elaeodendron transvaalense</i>	40 – 49 cm	10 – 19 cm
<i>Warburgia salutaris</i>	> 40 cm	15 – 19 cm

Warburgia salutaris





- It is possible to use market information to assess resource condition
- These relationships are species specific
- Age of bark in market is an important variable
 - bark thickness can reduce by 50% after 12 weeks in open
 - different bark types have different drying characteristics
- Study also enabled a better understanding of wound recovery patterns

E. transvaalense

Mean wound recovery

(hole closure)

$22.6 \pm 24.3 \%$



A. adianthifolia

Mean recovery

100 %



W. salutaris

Mean recovery

67.2 ± 20.9 %



R. chirindensis

Mean recovery

$93.9 \pm 7.8 \%$



B. maughamii

Mean recovery

14.4 ± 18.8 %

