

Peter Aspin



Ash



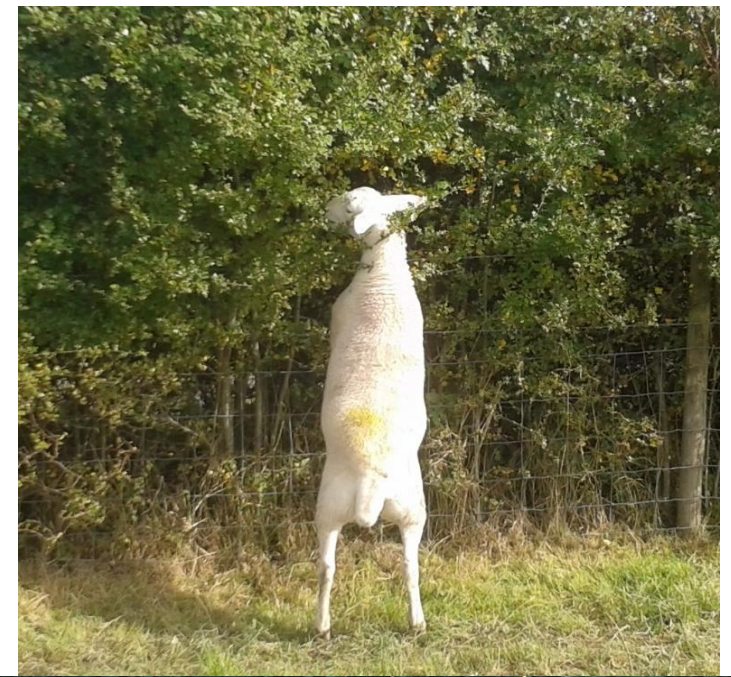
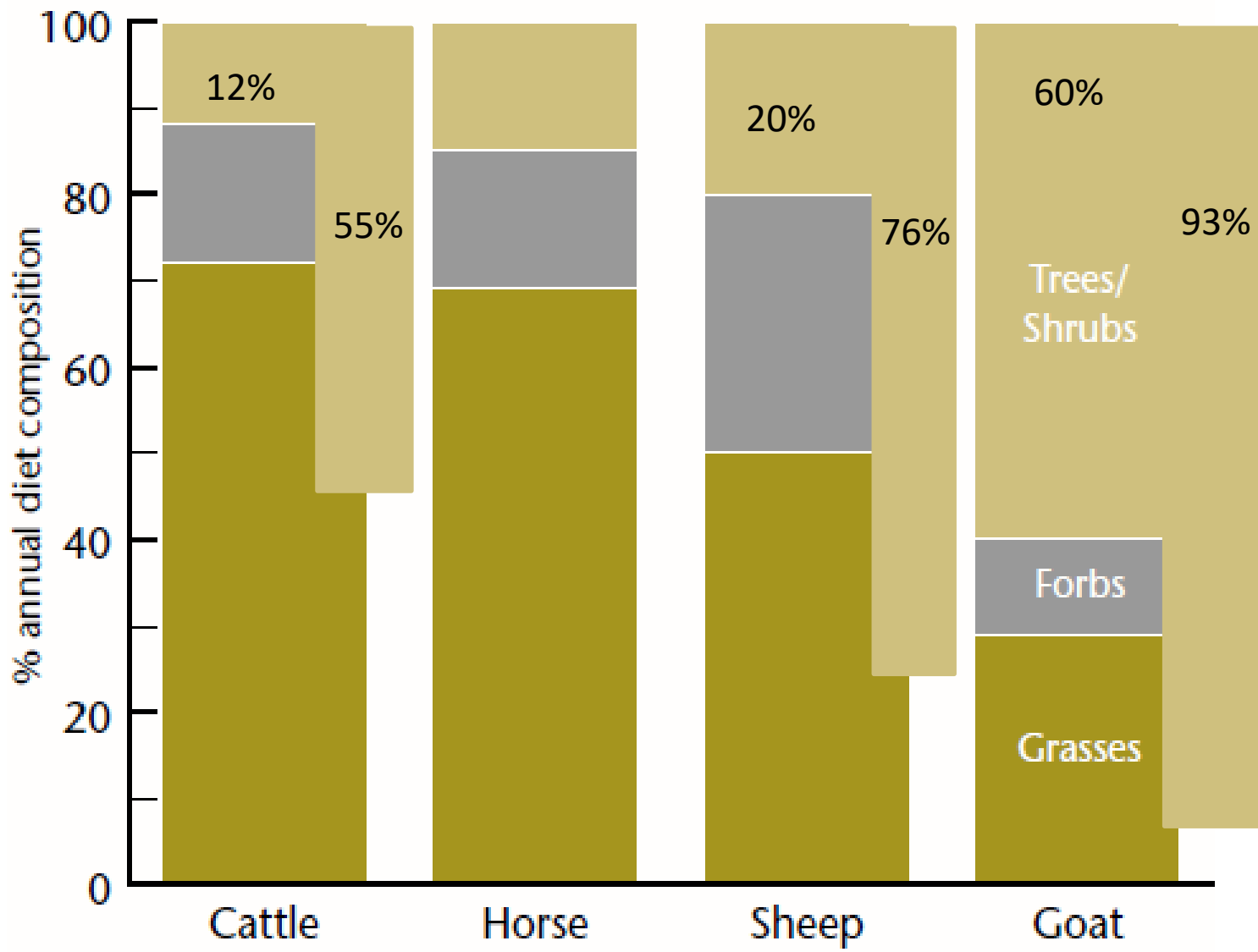
Holly

Traditional fodder trees

Elm



Variation in the diet of domestic stock



Palatability

Tree species

- 1 Aspen, Willow
- 2 Ash, Rowan
- 3 Hazel, Oak
- 4 Scots pine,
Juniper, Holly
- 5 Birch,
Hawthorn
- 6 Beech
- 7 Alder

Heifers (May – September)	Time spent browsing (%)	Species preferred
Spring	19.3	Hazel Hawthorn Hornbeam
Early summer	5.9	
Late summer	5.4	

Hedge: field maple, sycamore, hornbeam, dogwood, hazel, hawthorn, ash, black poplar, oak, false acacia and elder.

All species were browsed at least once except false acacia

Vandermeulen et al., 2016

Leaf nutrition in tree species compared to hay and red clover (%). In: Birks et al, 1989.

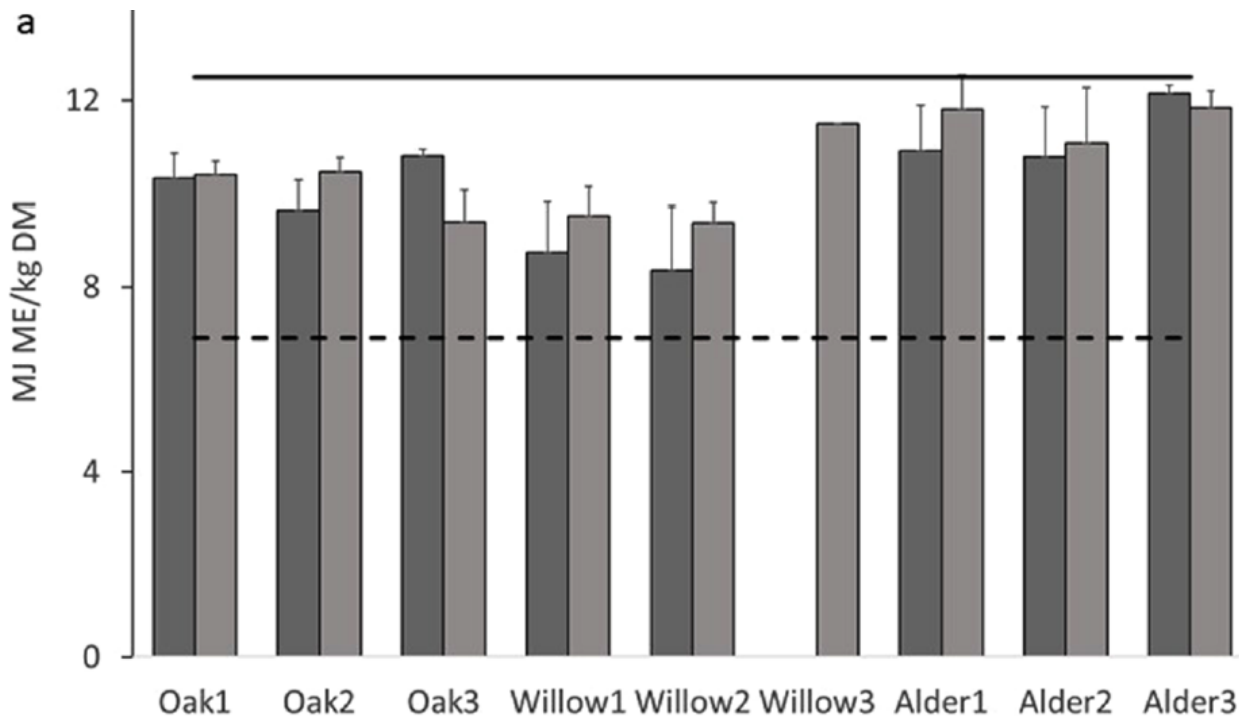
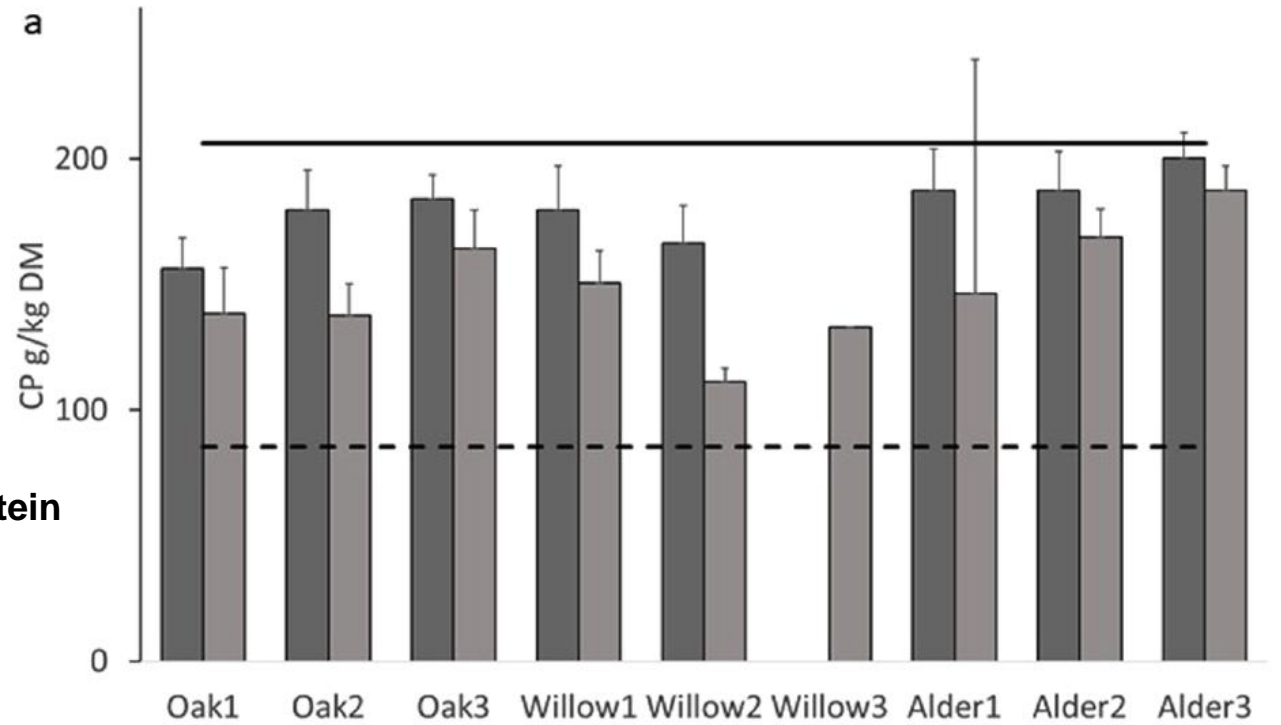
Tree species	Moisture	Ash	Fat	Sugar	Protein	Fibre
Wych elm	12.6	9.9	2.9	49.2	13.2	12.3
Rowan	11.9	5.9	6.5	50.4	9.9	15.4
Goat willow	11.5	6.1	3.8	50.3	11.6	16.7
Aspen	10.8	8.5	6	43.5	13.3	20.9
Ash	11.6	6.3	3	50.4	12	16.7
Grey alder	11.9	3.9	5.9	43.6	17.6	17.4
Birch	11.7	3.9	7	49.2	12	16.2
Meadow hay	14.96	5.42	2.2	44.43	8.51	24.56
Red clover	15.65	5.17	1.88	36.76	10.98	28.56

3 Species:
Oak, Alder, Goat willow

3 Sites:
Berkshire, Leicestershire
Gwynedd

2 months:
June (dark grey)
September (light grey)

Crude Protein

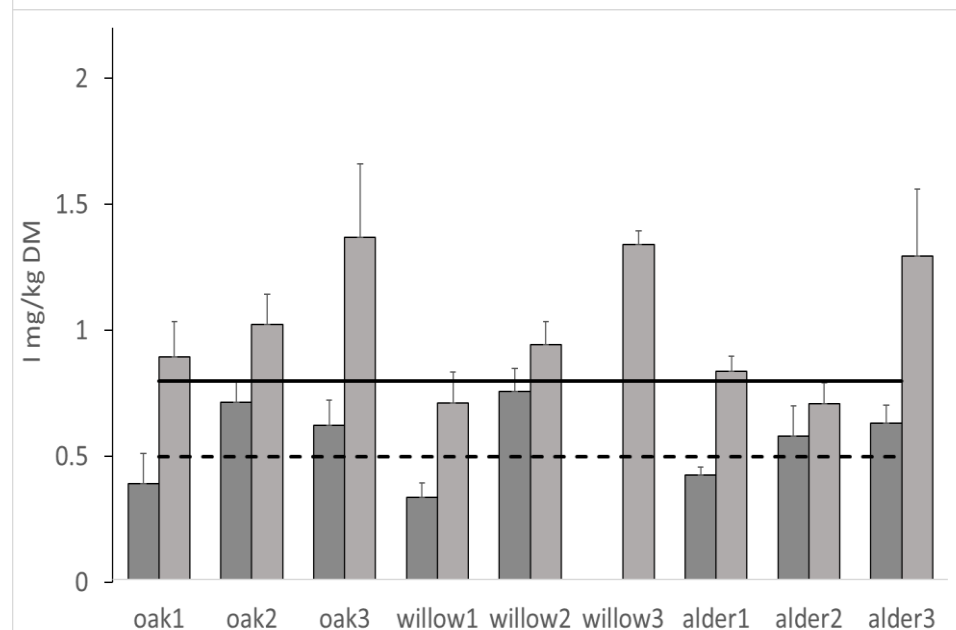
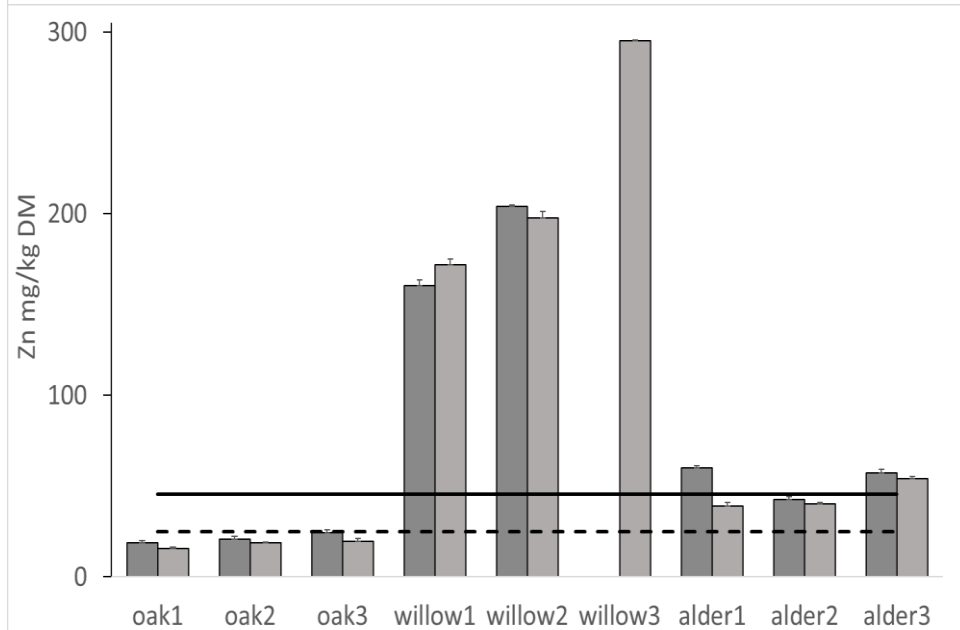
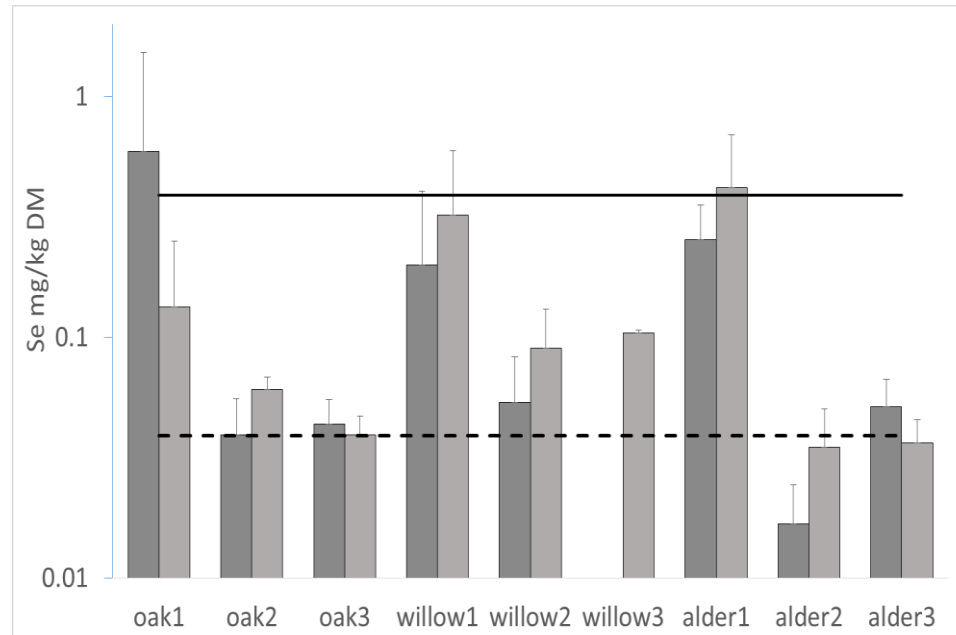
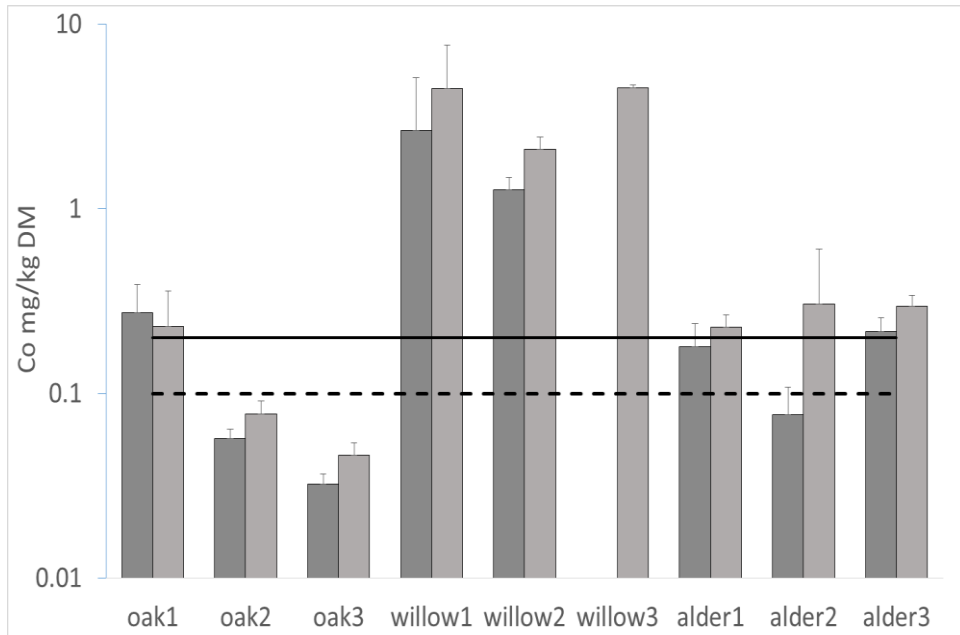


Metabolisable Energy

Growing lamb requirements:

———— 20kg; 250g/d

- - - - 40kg; 150g/d



Kendall et al 2021

Minerals retained in stored tree fodder

Harvested July, Analysed fresh, Stored until following March.
Analysed stored. Fed to housed cattle

	State	Fresh	Stored	Fresh	Stored	Fresh	Stored
Sample	Unit	Ash	Ash	Elm	Elm	Goat willow	Goat willow
Nitrogen DUMAS	% w/w	1.78	2.21	2.23	2.31	2.66	2.16
Phosphorus	mg/kg	3144	3661	2292	2362	4243	5501
Potassium	mg/kg	14065	20015	14722	20884	13942	18977
Calcium	mg/kg	12776	15987	10998	16758	10204	14522
Magnesium	mg/kg	2235	2681	1889	2798	1930	2682
Sulphur	mg/kg	1840	2348	1313	1655	2056	2571
Manganese	mg/kg	25.5	31.6	37.2	37.9	35.5	46.3
Copper	mg/kg	7.4	9.6	6.5	9.3	7.6	10.9
Zinc	mg/kg	18.5	22.9	31.7	40.1	118	144
Iron	mg/kg	91.2	116	138	258	75.7	142
Boron	mg/kg	15.7	17.5	19.3	26.0	12.7	18.2
		Fraxinus excelsior		Ulmus minor		Salix caprea	



Condensed tannins 1-4% of DM in diet has a positive effect on protein quality.

Anthelmintic properties

CH₄ (ml/g) produced off willow is less than off lucerne

200g of willow leaves per day reduces **N₂O** levels in urine

Benefits from condensed tannins in diet

Salicin content in willow

<u>Scientific name</u>	<u>Common Name(s)</u>	<u>Salicylic Acid (mg/g FW)</u>
S. daphnoides	European violet willow	3.21
S. caprea	Goat Willow	1.95
S. fragilis	Crack willow	1.65
S. viminalis	Osier willow	0.21
S. alba	White Willow	0.2







Vincent Delobel

Tree hay



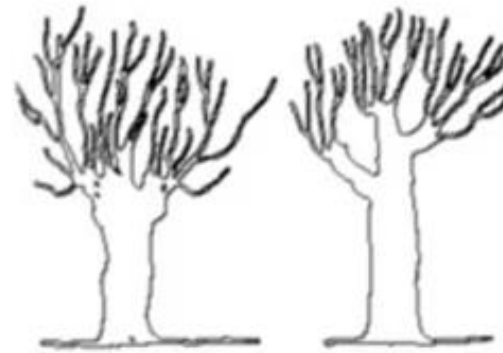
Tim Downes



Pruning methods



Coppicing



Pollarding



Shredding

Seymour, J. and Kamstra, L.D. (1979). Whole aspen tree silage as wintering feed for bred stock cows. *Aspen Bibliography*. Paper 4613



<https://nyvraa.dk/>



Du et al. (2022) *Frontiers in Microbiology*.





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