

# Nutritive value and degradability of leaves from temperate woody resources for feeding ruminants in summer



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The lack of information related to the feeding value of woody plants is a major constraint on the development of agroforestry for ruminants.

This study aims to characterise leaves from woody resources for feeding ruminants in summer, a period of low grassland production.

## Methods

### Sampling :

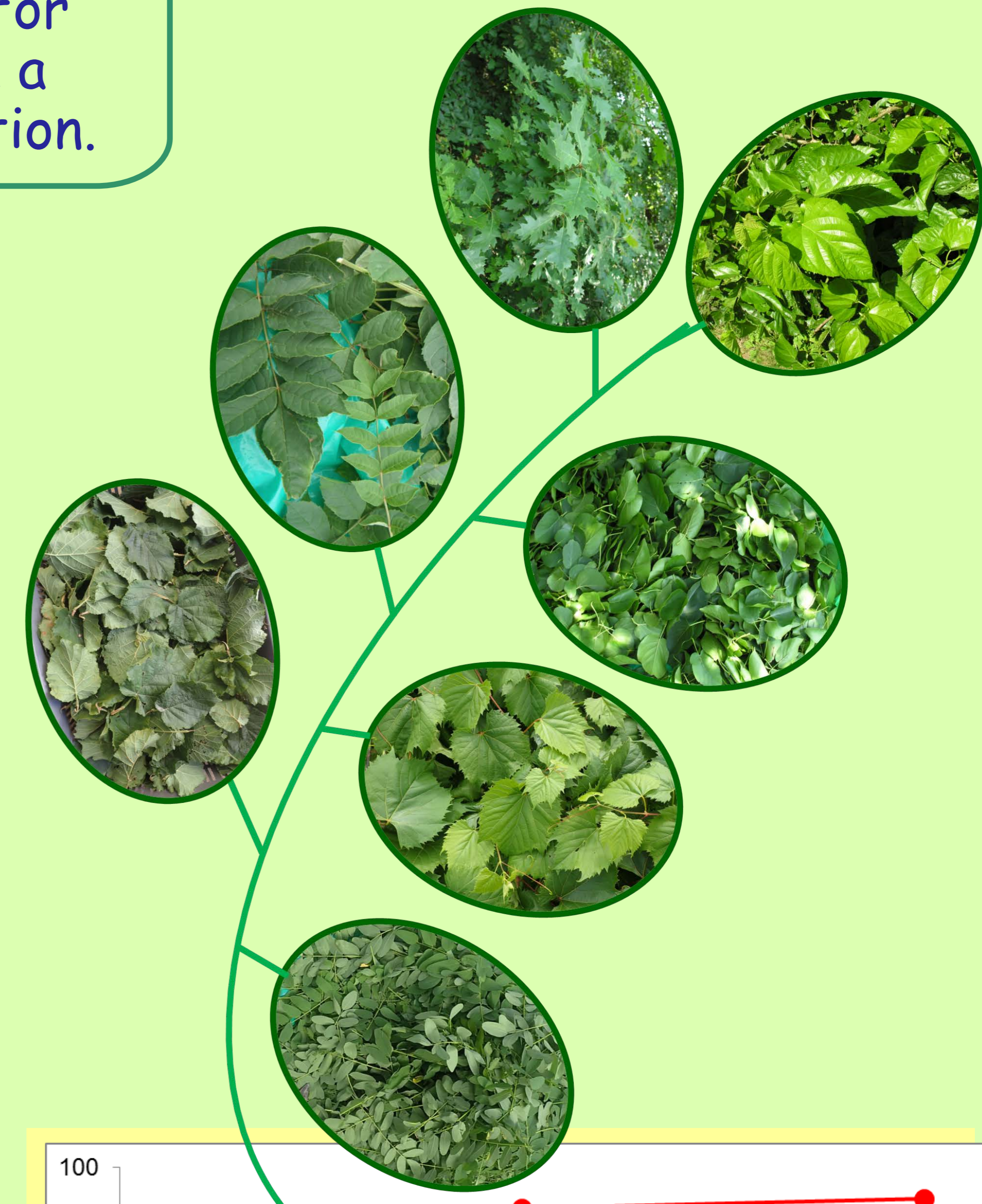
- \* Leaves collected during summer 2014 from twelve woody species managed as high stem trees, pollards, coppices or hedgerows (HS, PO, CO, HE - table)
- \* ryegrass and lucerne as herbaceous forage controls

### In vivo degradability :

- \* forage incubation (nylon bags) in the rumen of three ruminally fistulated dry cows, during 2, 4, 8, 16, 24 and 48 h
- \* dry matter and nitrogen effective ruminal degradability (EDDM and EDN)

### Chemical evaluation :

- \* crude protein (CP, as N  $\times$  6.25, Dumas method)
- \* fibre (NDF, ADF and ADL, Goering and van Soest method)
- \* *in vitro* DM digestibility (IVDMD).



## Results

Species	Management	Species	EDDM	EDN	CP	NDF	IVDMD
Black Alder	CO	<i>Alnus glutinosa</i>	51	31	197	296	77
Italian Alder	HS	<i>Alnus cordata</i>	52	32	170	358	69
Ash	CO	<i>Fraxinus excelsior</i>	64	50	145	279	75
Chestnut	HS	<i>Castanea sativa</i>	42	23	118	340	68
Elm	PO	<i>Ulmus X</i>	48	27	145	414	67
Hazel	HE	<i>Corylus avellana</i>	44	10	144	324	53
Lime	PO	<i>Tilia platyphyllos</i>	50	37	211	292	70
Black Locust	CO	<i>Robinia pseudoacacia</i>	38	18	204	278	49
Maple	HE	<i>Acer campestre</i>	47	30	134	286	64
Mulberry	PO	<i>Morus alba</i>	70	62	240	174	89
Red Oak	HS	<i>Quercus rubra</i>	37	14	142	400	61
Vine	CO	<i>Vitis vinifera</i>	57	29	106	193	80

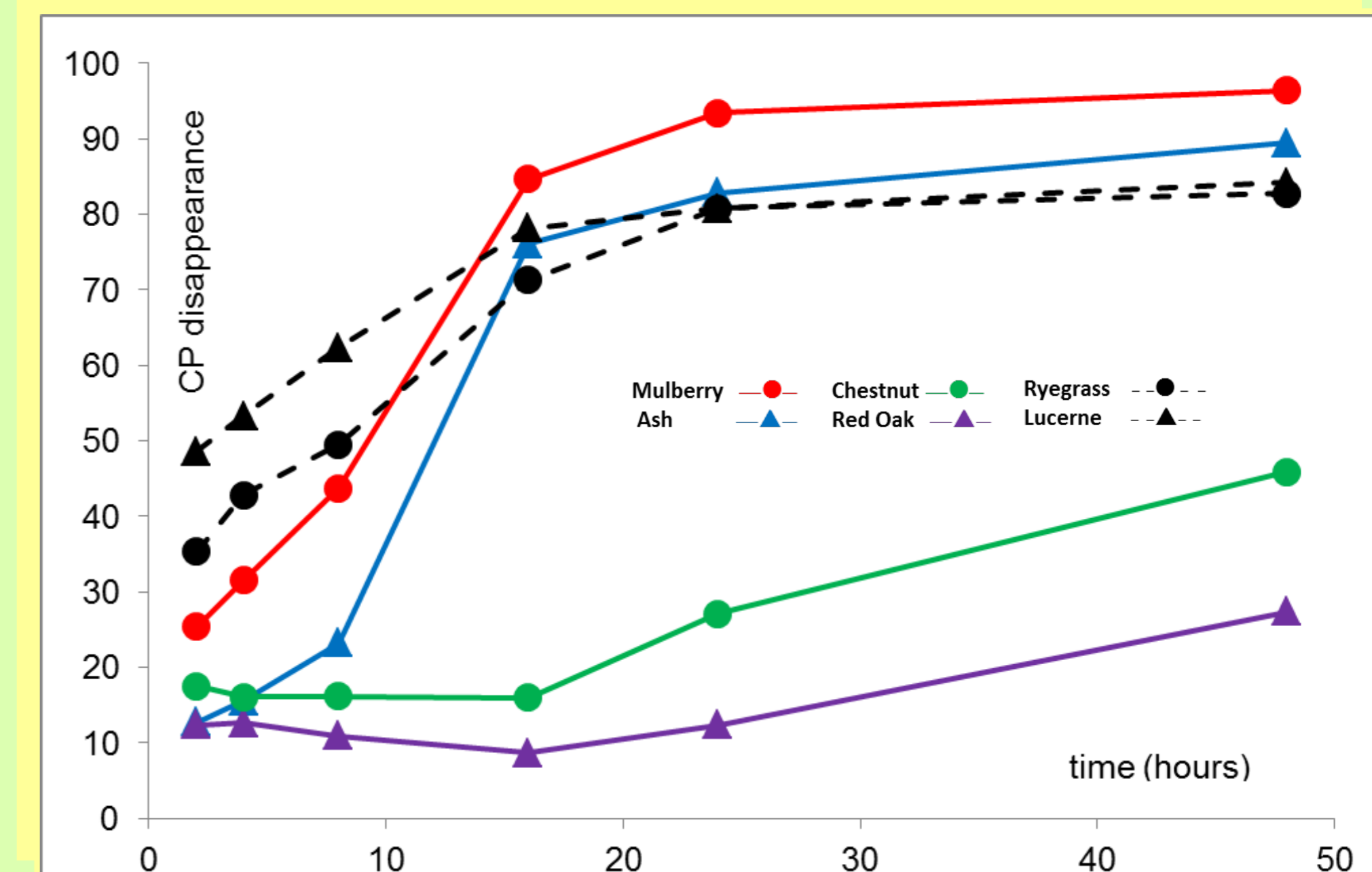
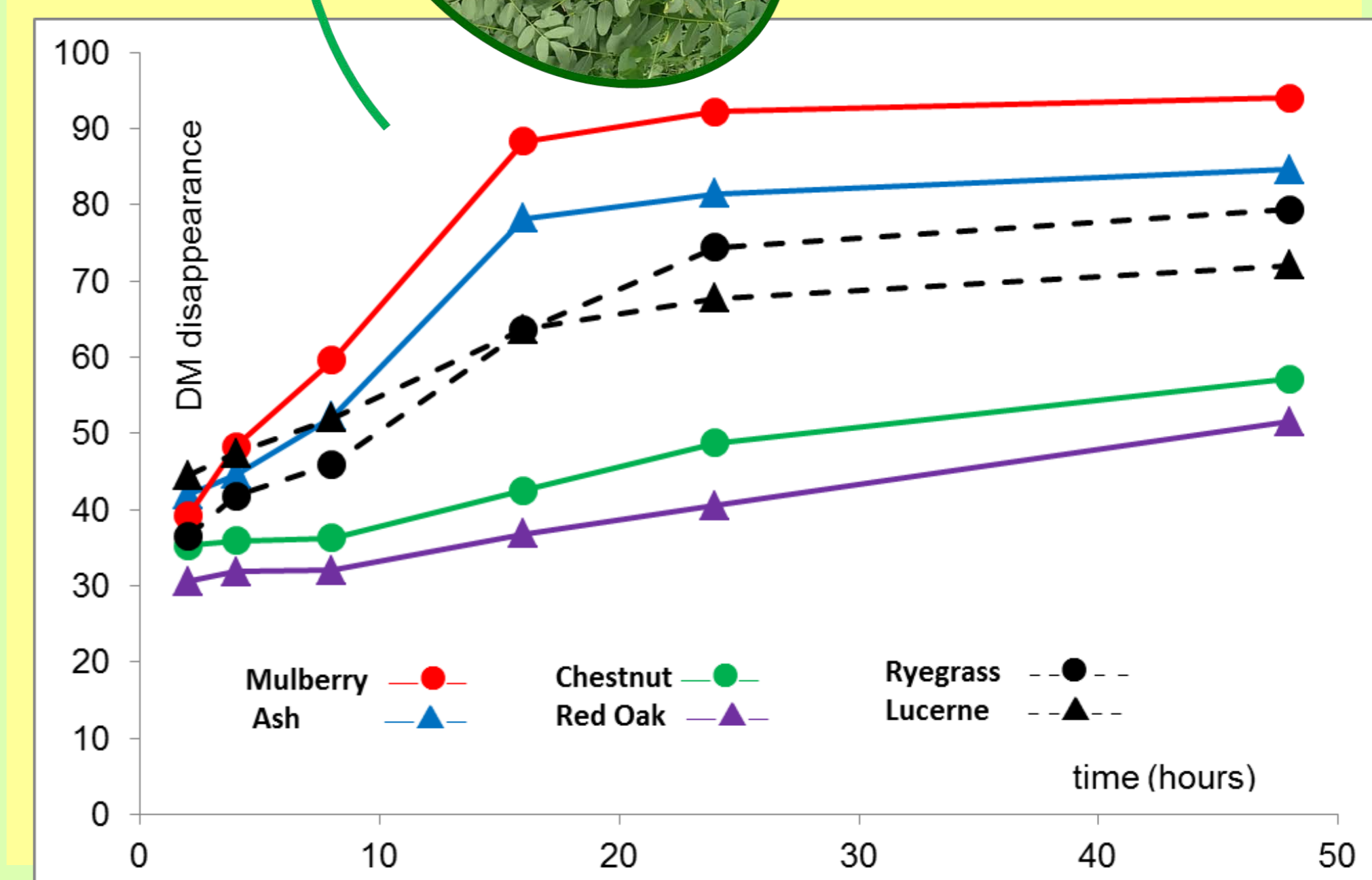
CP and NDF expressed in g/kg DM. IVDMD, EDDM and EDN expressed in %.

EDDM and IVDMD highly correlated,

( $R^2=0.74$ ;  $p<0.001$ )

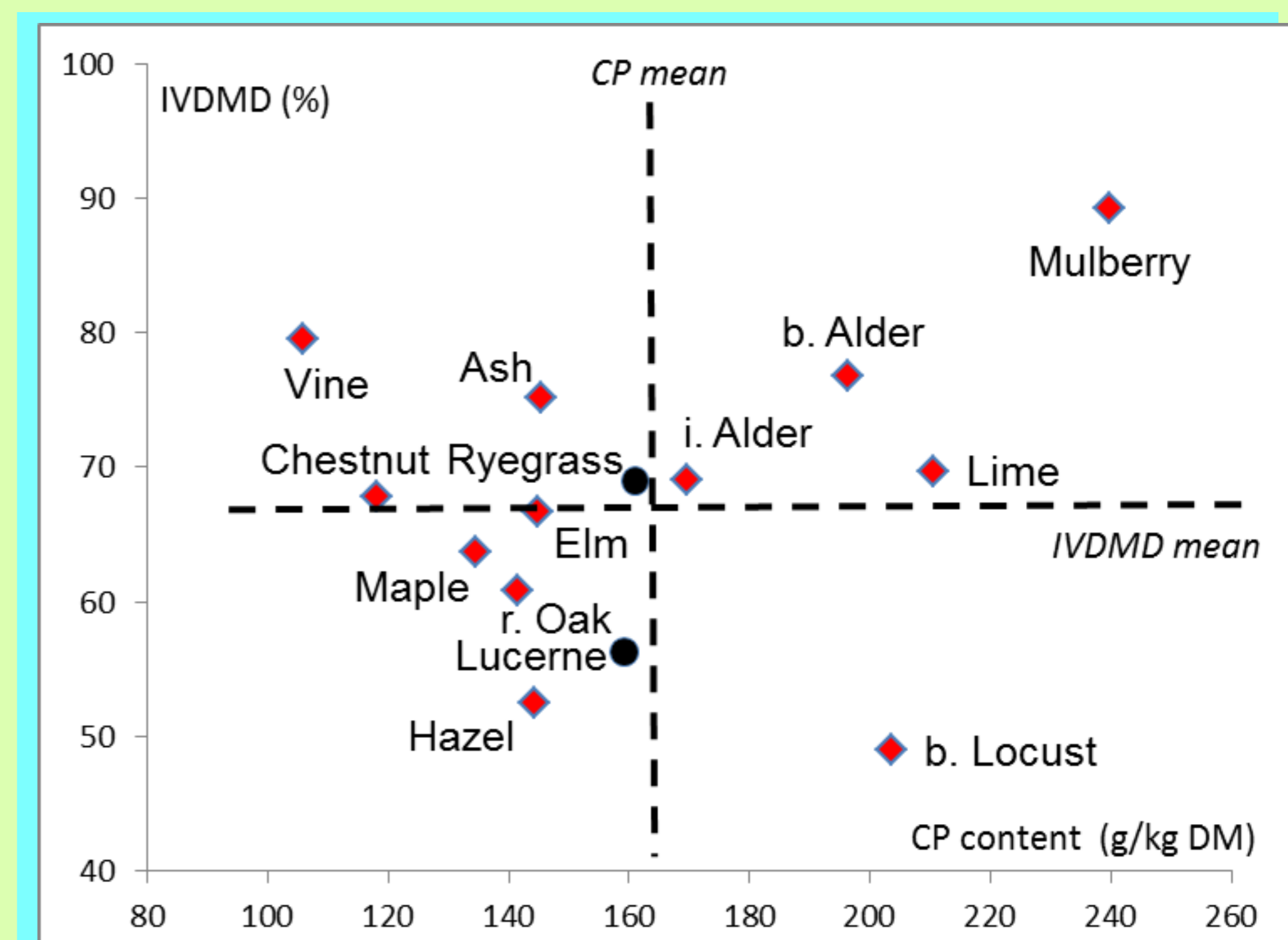
The lower EDN of some species suggests the presence of antimetabolites like tannins.

CP varies from less than 12 % to 24 % and IVDMD from less than 60 % to 89 %.



## Conclusions

- The nutritive value and ruminal degradability of leaves from woody resources collected during summer exhibit large variation between species.
- White mulberry, ash, alders and lime seem to have sufficient digestibility and nitrogen degradability to be included in the diet of lactating cows, especially during the critical summer period.
- In the future we will investigate more species of trees, shrubs and lianas, and also the effects of season (spring, summer, autumn) and tree management (pollarding, coppicing).
- The effect of tannins concentrations on protein availability for ruminal microbes will be investigated.



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