COMPARISON OF METHODS FOR ESTIMATING HERBAGE INTAKE IN GRAZING DAIRY COWS

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BACKGROUND

- The number of dairy cows on summer grass has decreased in Denmark
- Advantages of a system where cows are grazing
  - Reduction in mortality
  - Reduction in lesions on legs
- Why are the cows not grazing
  - Herd size
  - Access to grass
  - **How much grass does the cow eat?**

Source: Jens Tønnesen - Landbrugsavisen

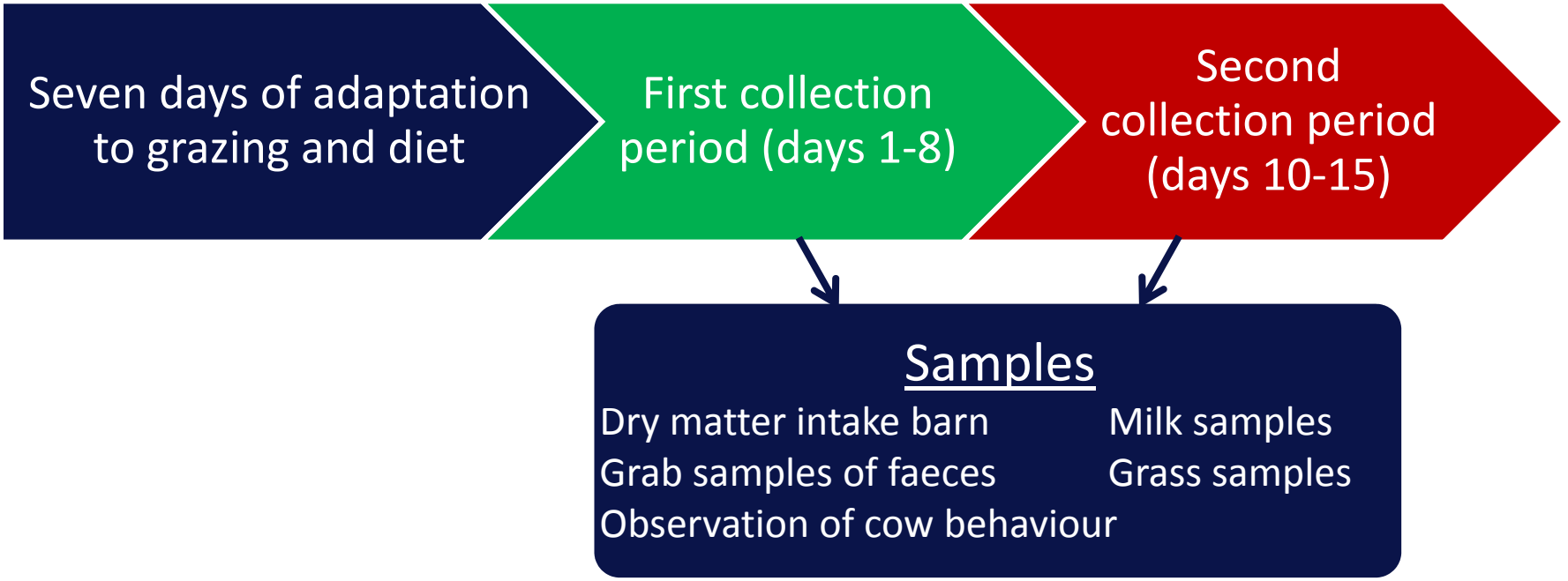
AIM

To compare different methods for estimating herbage intake of cows grazing seven hours daily

DESIGN

- Two seasons (spring and autumn)
- Two measuring periods in each season
- Two stocking rates each season (low (LS) and high (HS))
- Twenty cows per season
- Cows grazing seven hours daily and fed a mixed ration ad libitum in barn
- Observation of behaviour (standing, laying and grazing activity)

EXPERIMENTAL SCHEDULE



STOCKING RATE

- Spring
  - LS: 0.75 hectare/cow
  - HS: 0.57 hectare/cow
- Autumn
  - LS: 1.42 hectare/cow
  - HS: 1.08 hectare/cow

LS = low stocking rate
HS = high stocking rate

MIXED RATION

Values are given in g/kg dry matter	Mixed ration
Maize silage	538
Sugar beet pellets	251
Rape seed cake 11.5 % fat	143
Sugar cane molasses	50
Calcium carbonate	7
Minerals	7
Vitamins	4

METHODS USED TO ESTIMATE HERBAGE INTAKE

Spring

- Animal performance (NE)
- Intake capacity (IC)
- Stable isotope (^{13}C)
  - No assumptions (C13-1)
  - Assumption of discrimination in intestinal tract (C13-2)
  - Assumption of discrimination and digestibility (C13-3)
- Combination of two internal markers, INDF/ADL (INDF-ADL)

Autumn

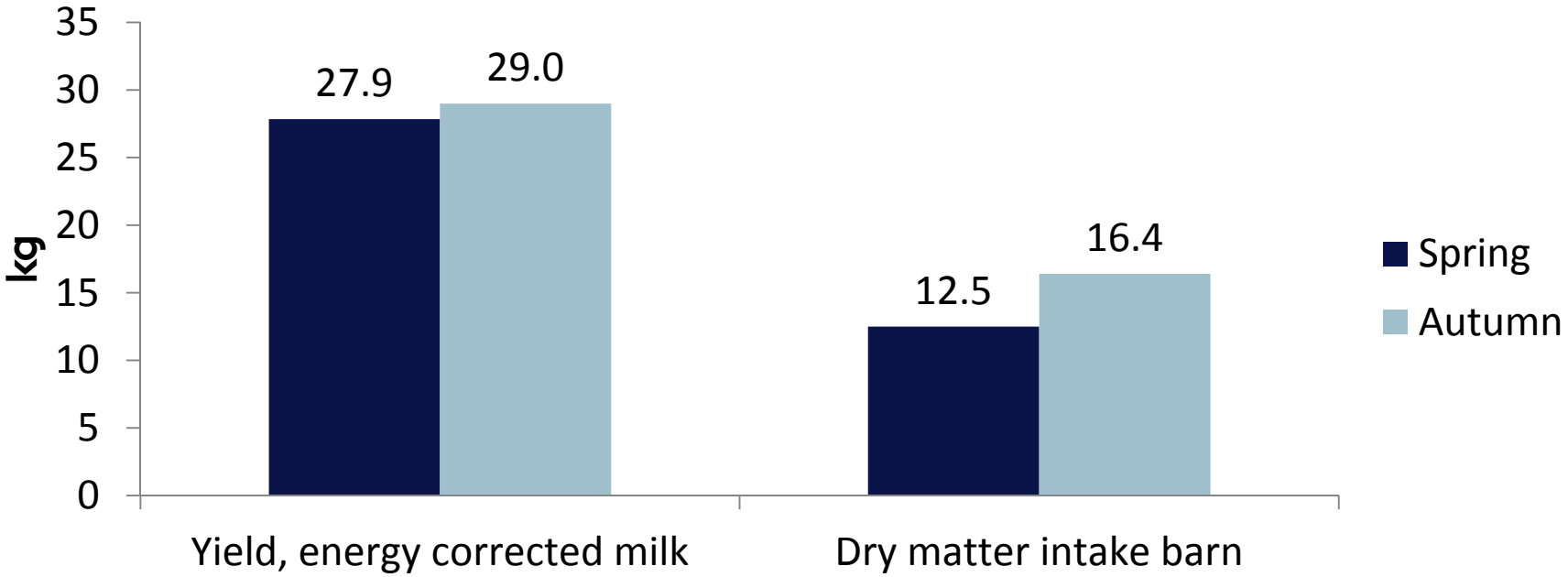
- Same as spring plus
- Autumn - Single pulse dose of external marker fed in concentrate (TiO_2)
  - TiO_2 together with in vitro organic matter digestibility (Ti-OM)
  - TiO_2 together with ADL (Ti-ADL)
  - TiO_2 together with INDF (Ti-INDF)

CHEMICAL COMPOSITION

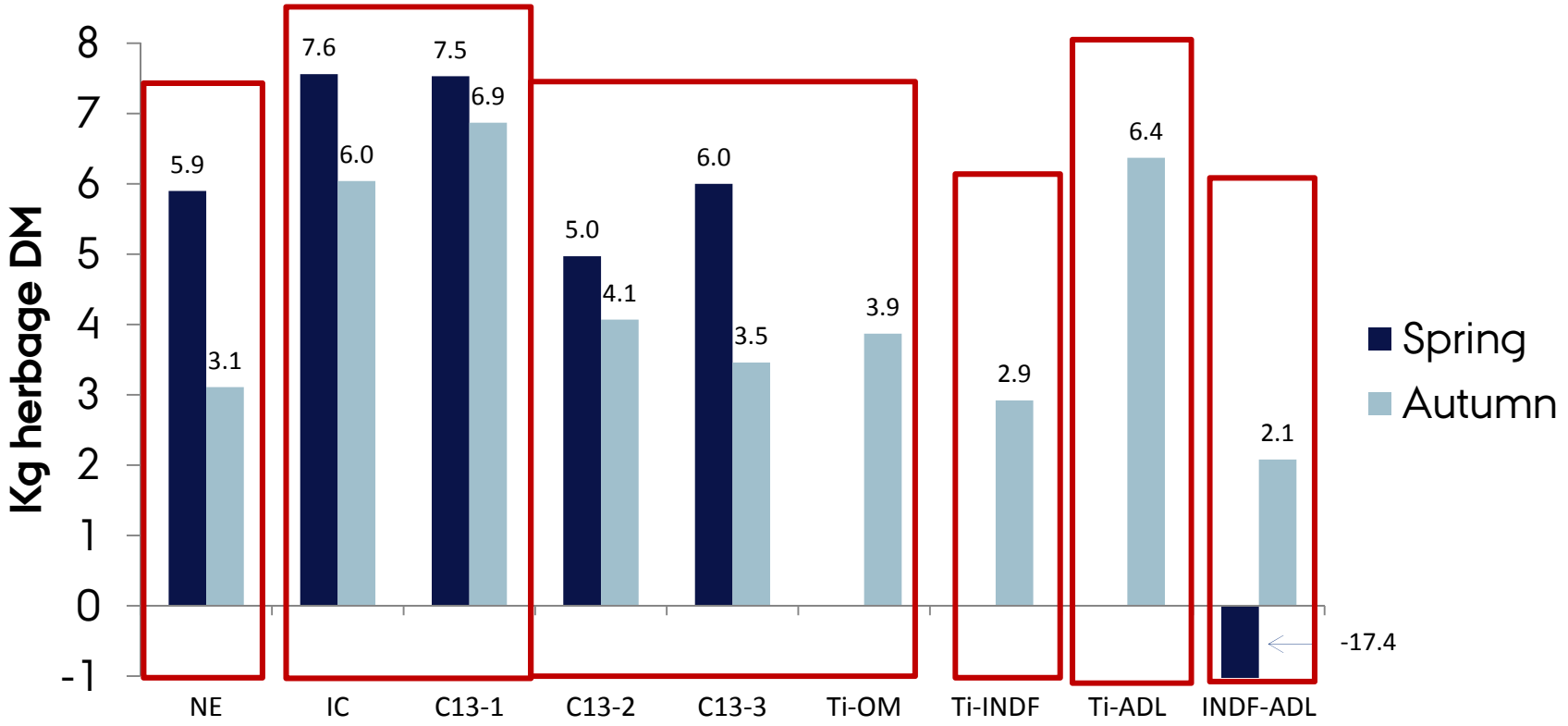
	Mixed ration[1]	Spring Herbage[2]	Autumn Herbage[2]
Dry matter (g/kg)	463	218	190
Ash (g/kg DM)	66	71	85
Crude protein (N*6.25)(g/kg DM)	141	131	187
Crude fat (g/kg DM)	53	27	41
NDF (g/kg DM)	325	409	437
INDF (g/kg DM)	68	39	65
ADL (g/kg DM)	32	15	21
INDF/ADL	2.1	2.6	3.1
Organic matter digestibility (g/100 g)	78.7	82.5	74.8
^{13}C (δ)	-18.80	-29.00	-28.98

[1] Average between spring and autumn
[2] Average between stocking rates

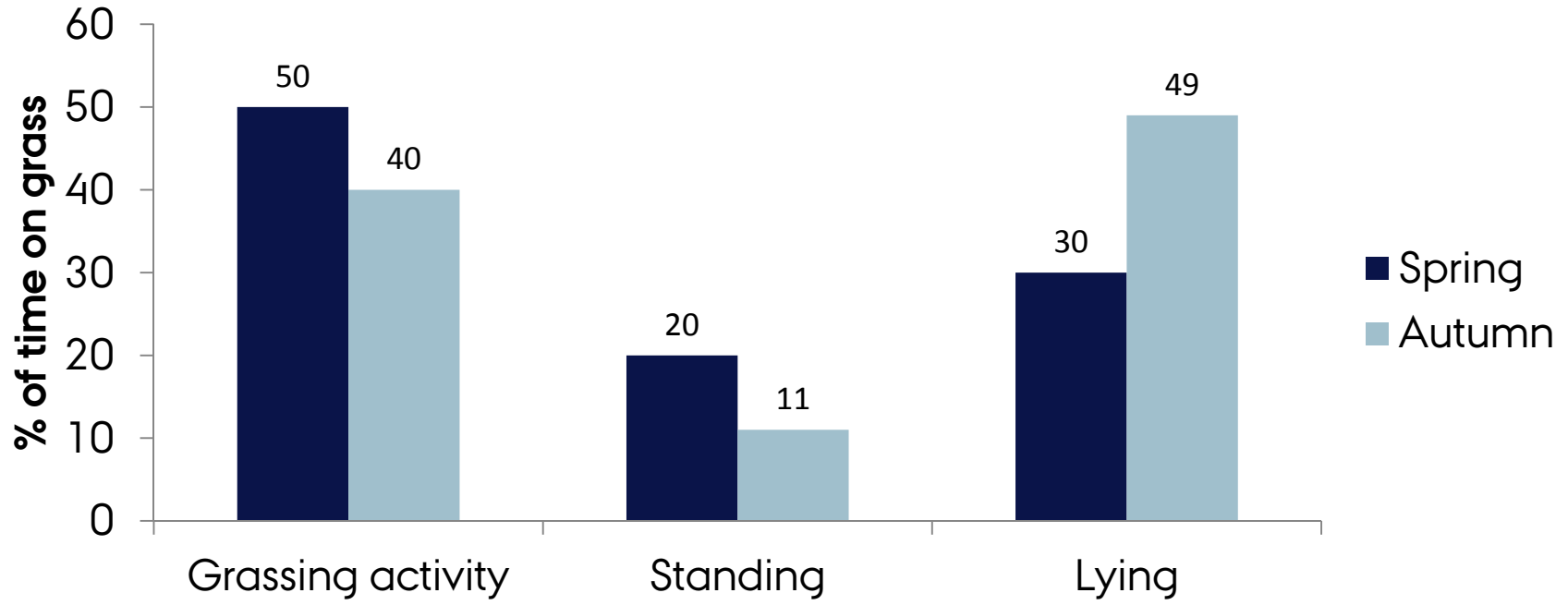
MILK YIELD AND DRY MATTER INTAKE BARN



HERBAGE INTAKE



ACTIVITY ON GRASS



CORRELATION BETWEEN METHODS - SPRING

	$DMI_{Herb-C13-3}$	$DMI_{Herb-INDF-ADL}$	Grazing time
$DMI_{Herb-NE}$	-0.02	0.12	0.41
$DMI_{Herb-C13-3}$		0.10	0.30
$DMI_{Herb-INDF-ADL}$			0.44

CORRELATION BEWEEN METHODS - AUTUMN

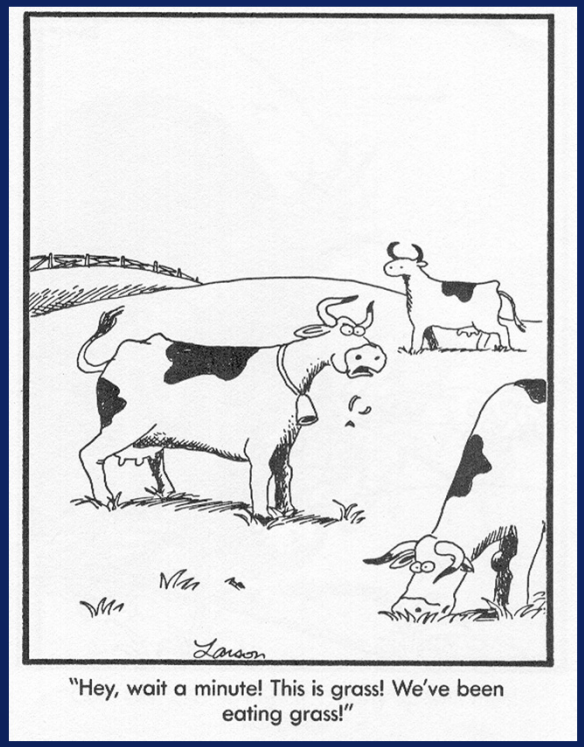
	$DMI_{Herb-C13-3}$	$DMI_{Herb-Ti-OM}$	$DMI_{Herb-Ti-INDF}$	$DMI_{Herb-Ti-ADL}$	$DMI_{Herb-INDF-ADL}$	Grazing time
$DMI_{Herb-NE}$	0.31	0.12	-0.25	-0.10	-0.16	0.40
$DMI_{Herb-C13-3}$		0.28	-0.03	0.28	-0.30	0.55
$DMI_{Herb-Ti-OM}$			0.65	0.58	0.01	0.64
$DMI_{Herb-Ti-INDF}$				0.29	0.52	0.27
$DMI_{Herb-Ti-ADL}$					-0.64	0.28
$DMI_{Herb-INDF-ADL}$						-0.06

CONCLUSION

- Herbage intake differed between methods
- The correlation between methods where low

Which method gives the ”correct ” herbage intake?

Thank you for your attention



"Hey, wait a minute! This is grass! We've been eating grass!"