

Chewing activity as a measurement for feed intake in grazing systems

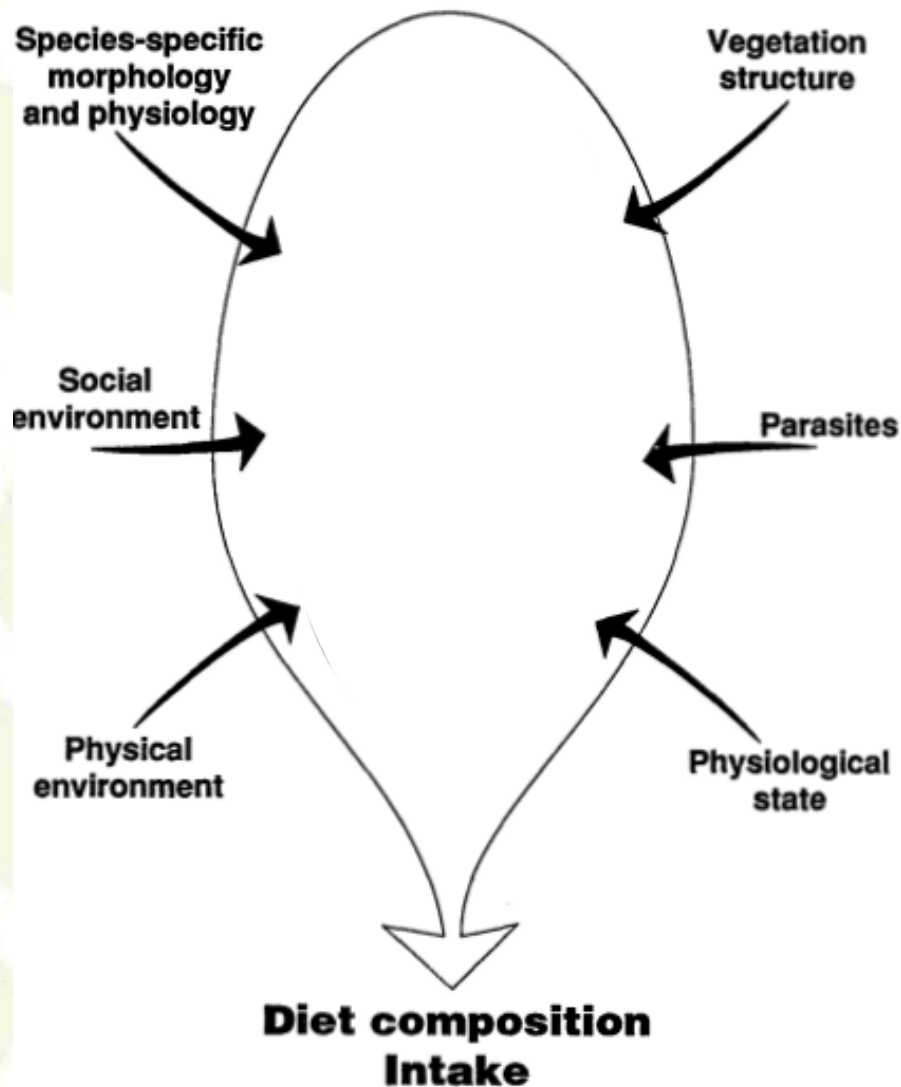


Foraging strategies of grazing animals

- Grazing ruminants form the backbone of most of the world's ruminant livestock enterprises (Fitzhugh et al., 1978).
- These animals graze a variety of vegetation types from simple sown monocultures, typical of intensively managed grassland, to complex mixtures of vegetation communities, typical of rangelands.
- The level of production obtained from animals grazing these vegetation types is dependent upon their ability to obtain a diet adequate to meet their nutrient requirements
- This in turn is regulated by a series of short-term and long term tactical decisions



FORAGING STRATEGY

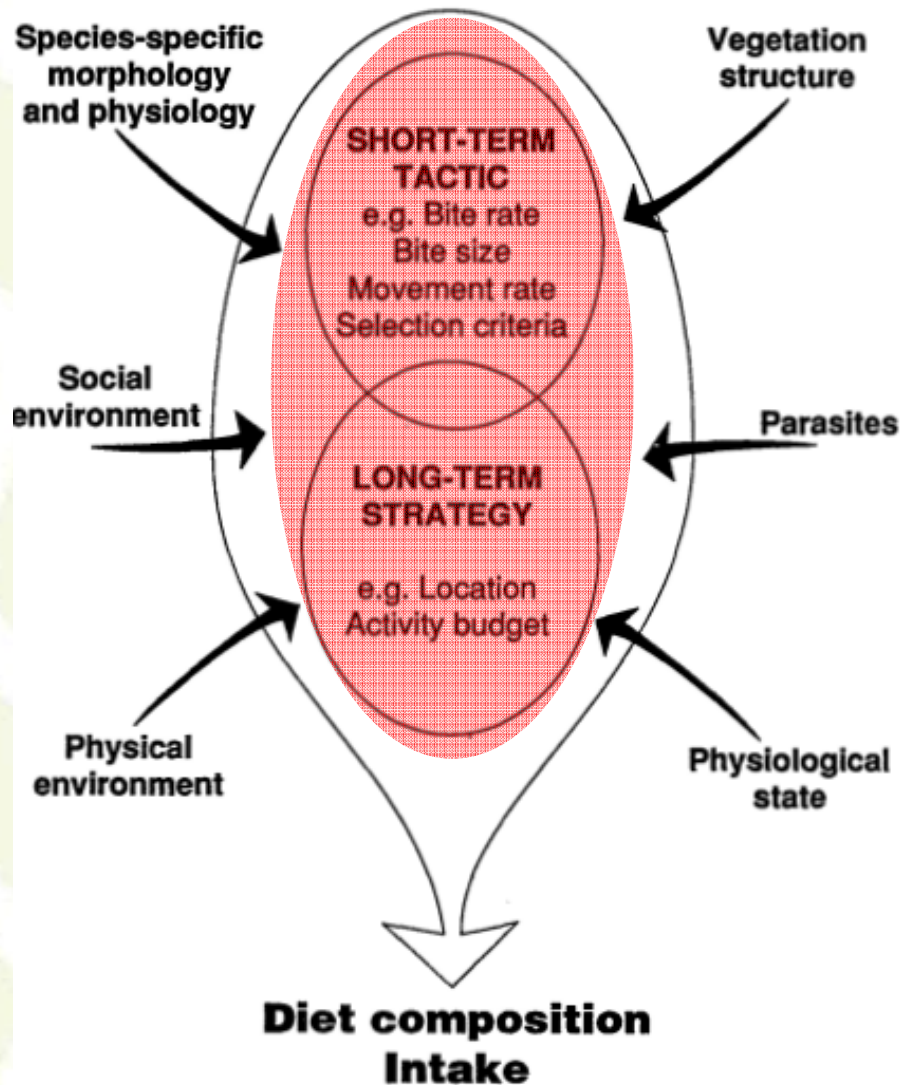


Animal independent factors

Source: Gordon et al., 1995



FORAGING STRATEGY

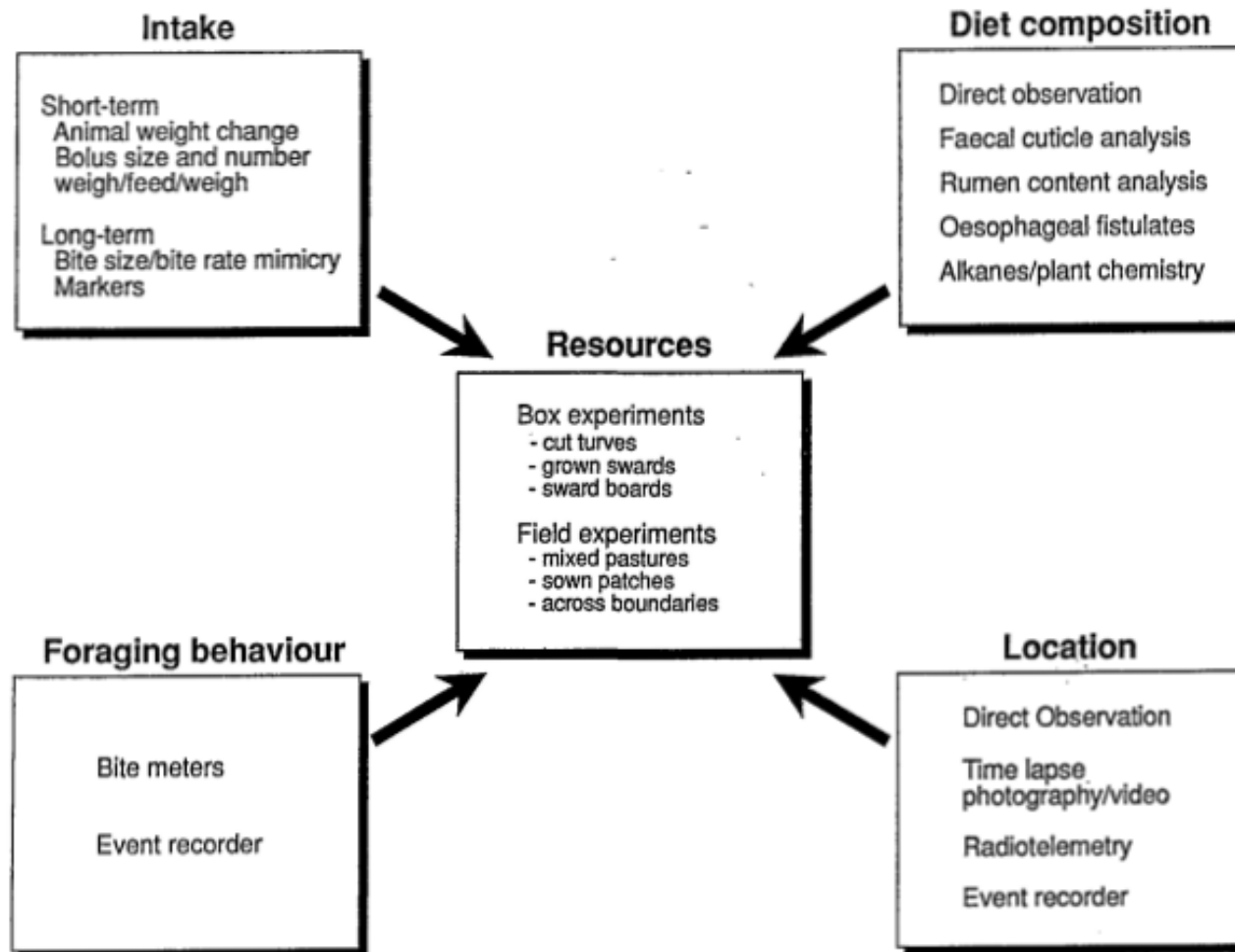


Factors influenced by the animal

Source: Gordon et al., 1995



Approaches and techniques used to measure the various components of the foraging strategies

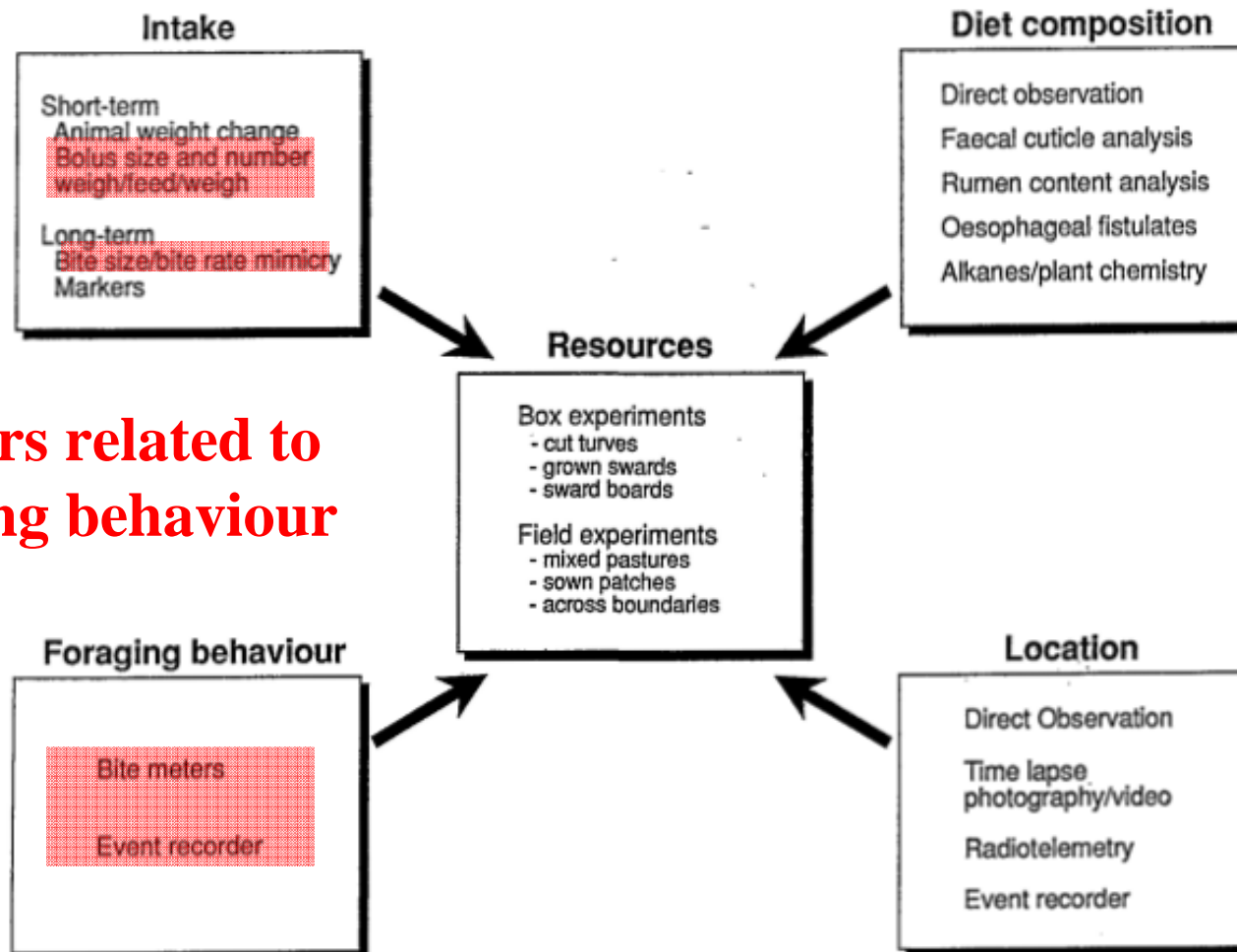


Source: Gordon et al., 1995



Approaches and techniques used to measure the various components of the foraging strategies

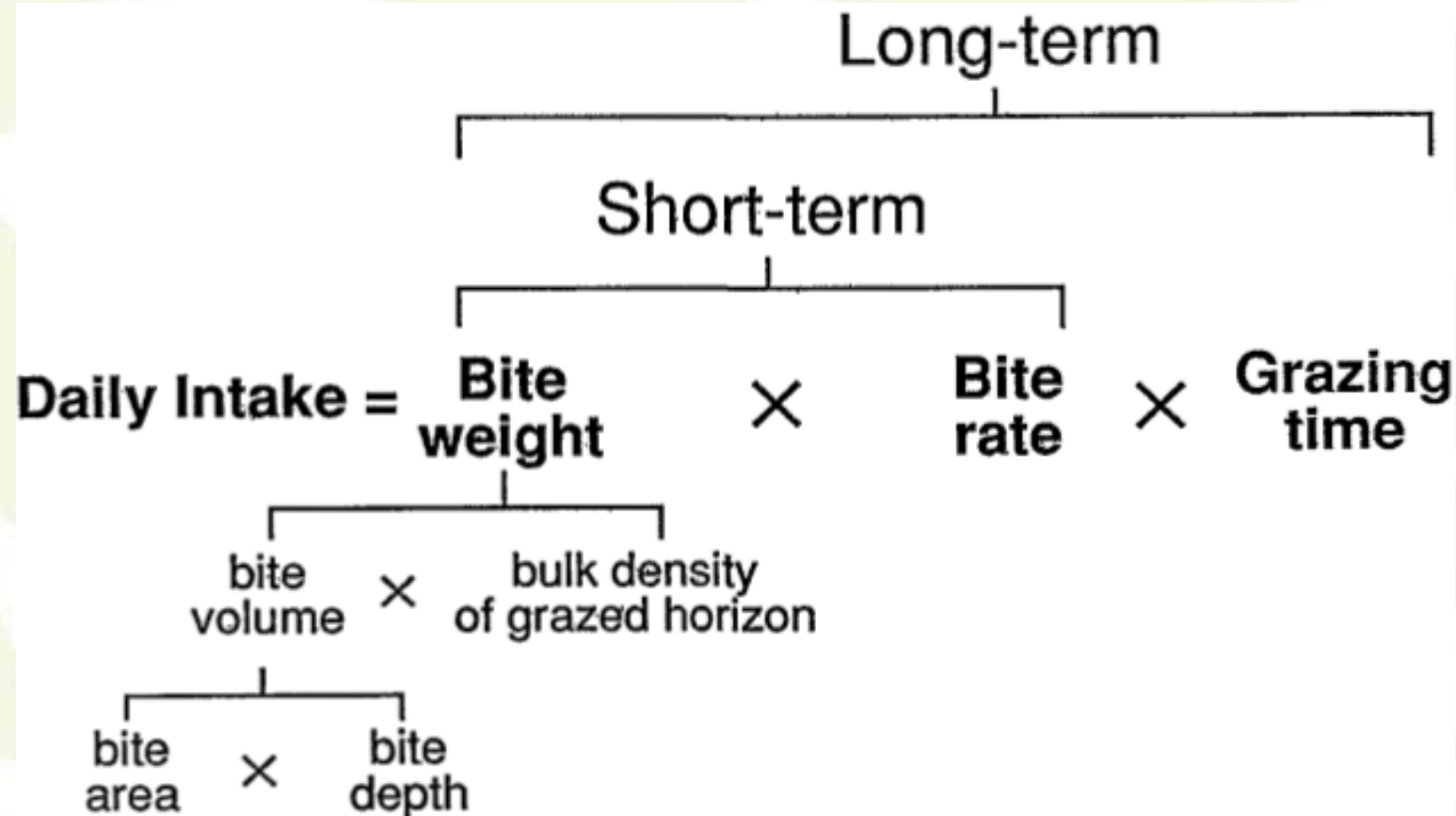
Factors related to chewing behaviour



Source: Gordon et al., 1995

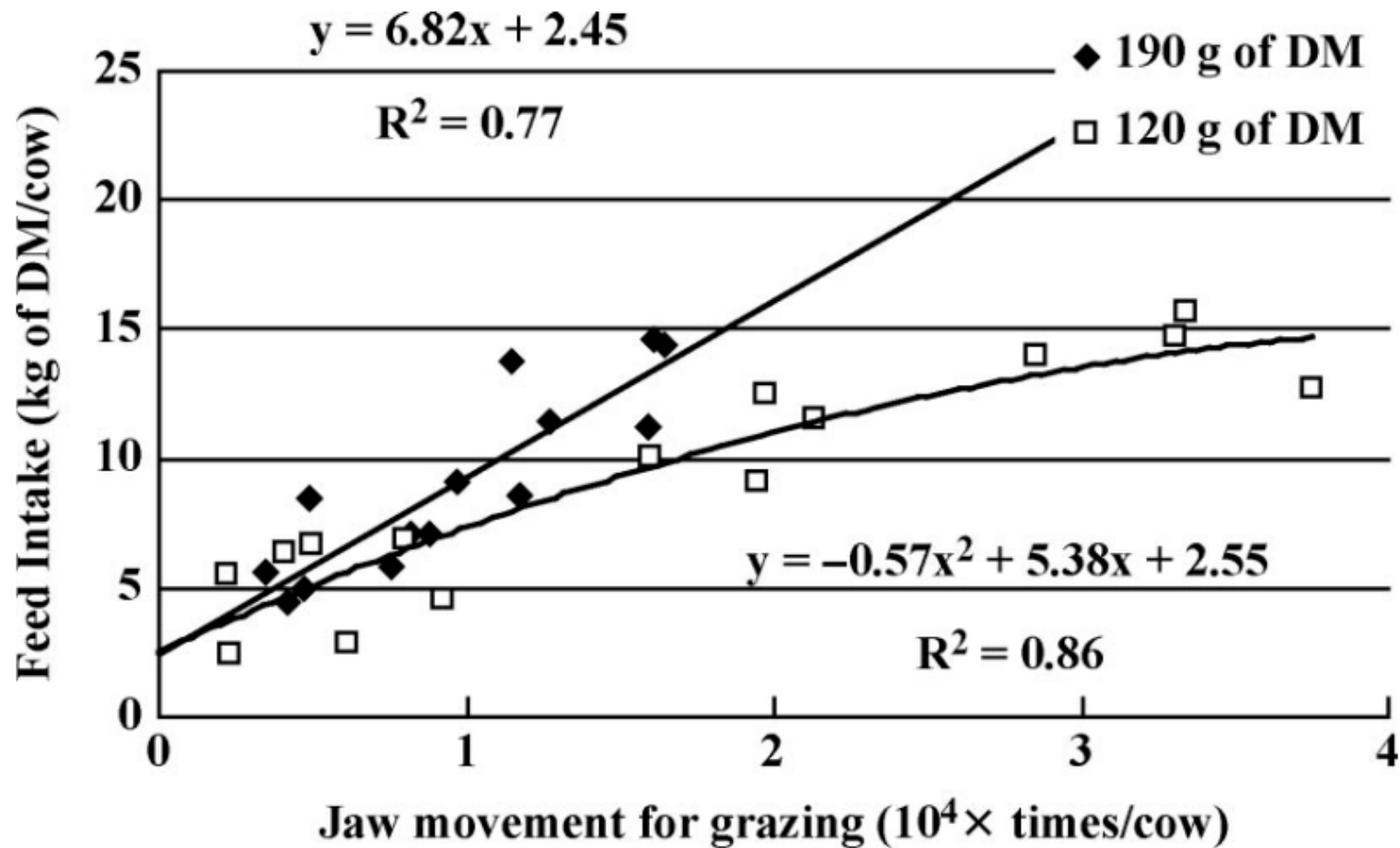


Factors related to chewing behaviour



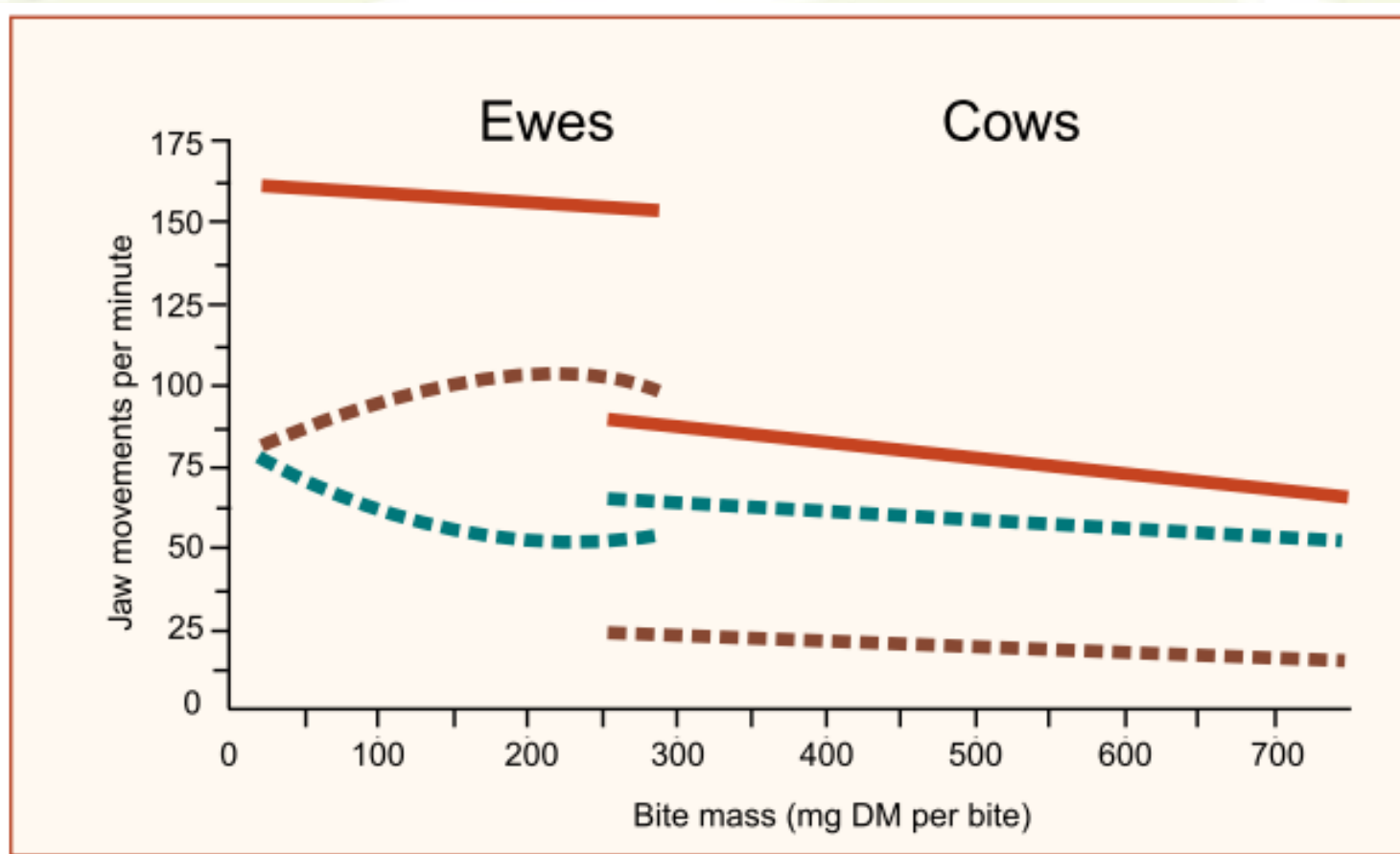
Source: Gordon et al., 1995





Source: Umemura et al., 2009



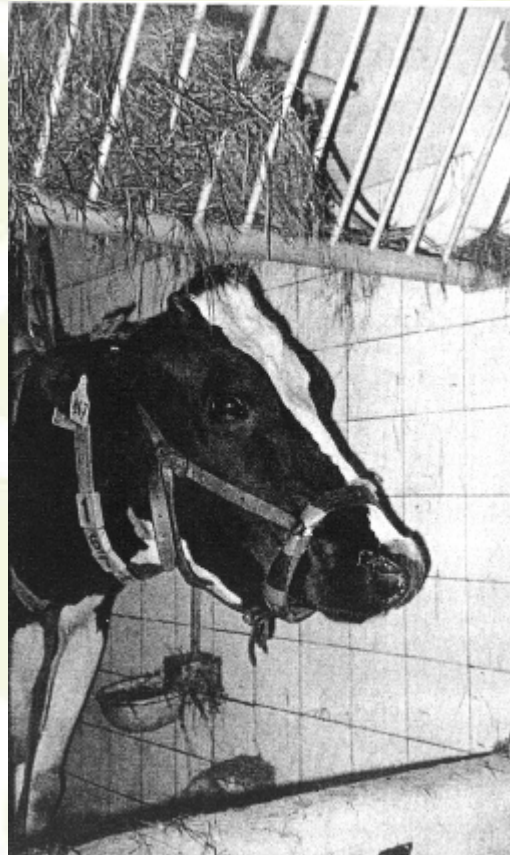


Relationships between total jaw movement (—), bites (---) and mastications (---) for lactating ewes and cows grazing ryegrass.

Source: IGER Innovations 1997



Devices to record the chewing behaviour



Devices to record the chewing behaviour

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Stobbs and Cowper—Jaw movements of cattle

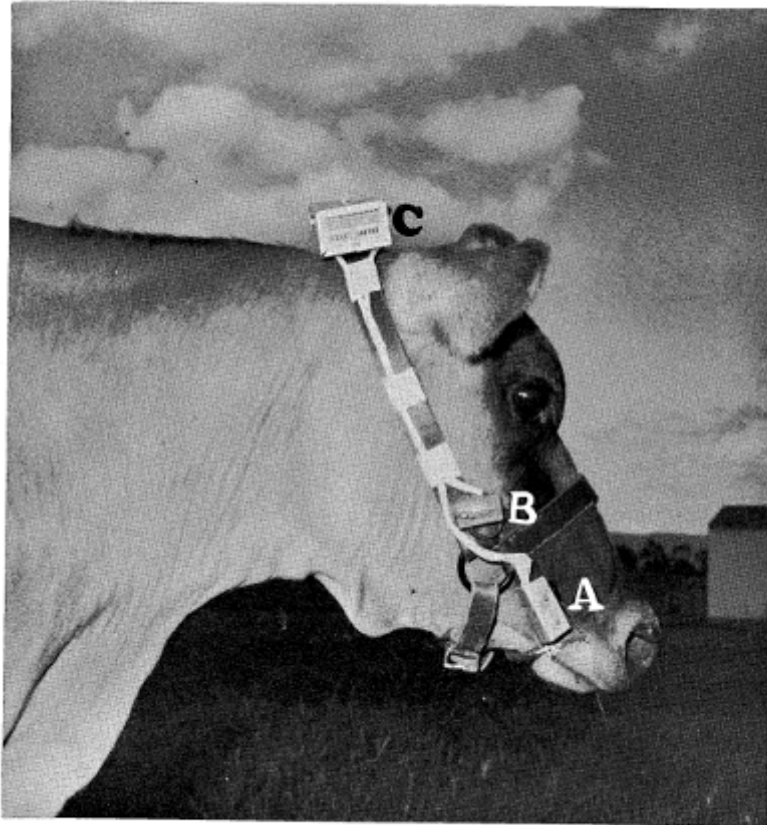
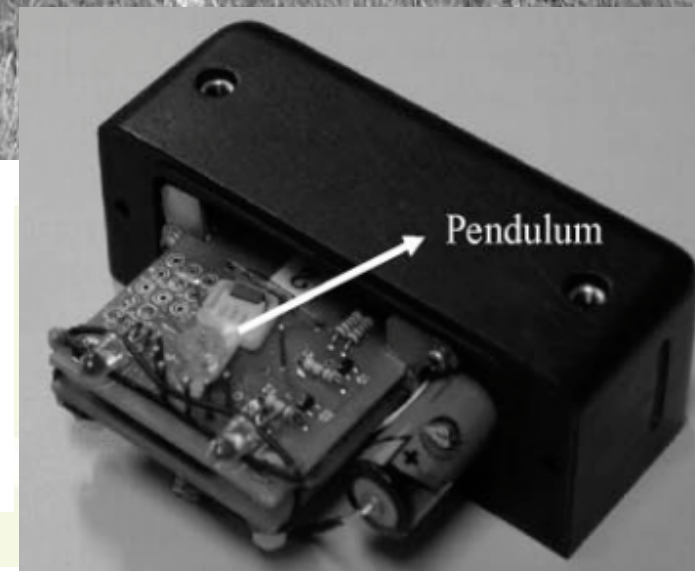


FIGURE 1

Photograph showing the position of the recorder for measuring jaw movements of dairy cattle during grazing and rumination.

A—jaw switch, B—mercury switch, C—recorder assembly.



A new measuring system for recording and analysing the chewing behaviour of free ranging cows



Datalogger

Sensor

Datarecording

Autonomic recording over 10 days with a measurement rate of 20 Hz

Analysing Software

Categorizing of the chewing behaviour into rumination, eating or other behaviour. Saving of exact date and time of each behavioural pattern

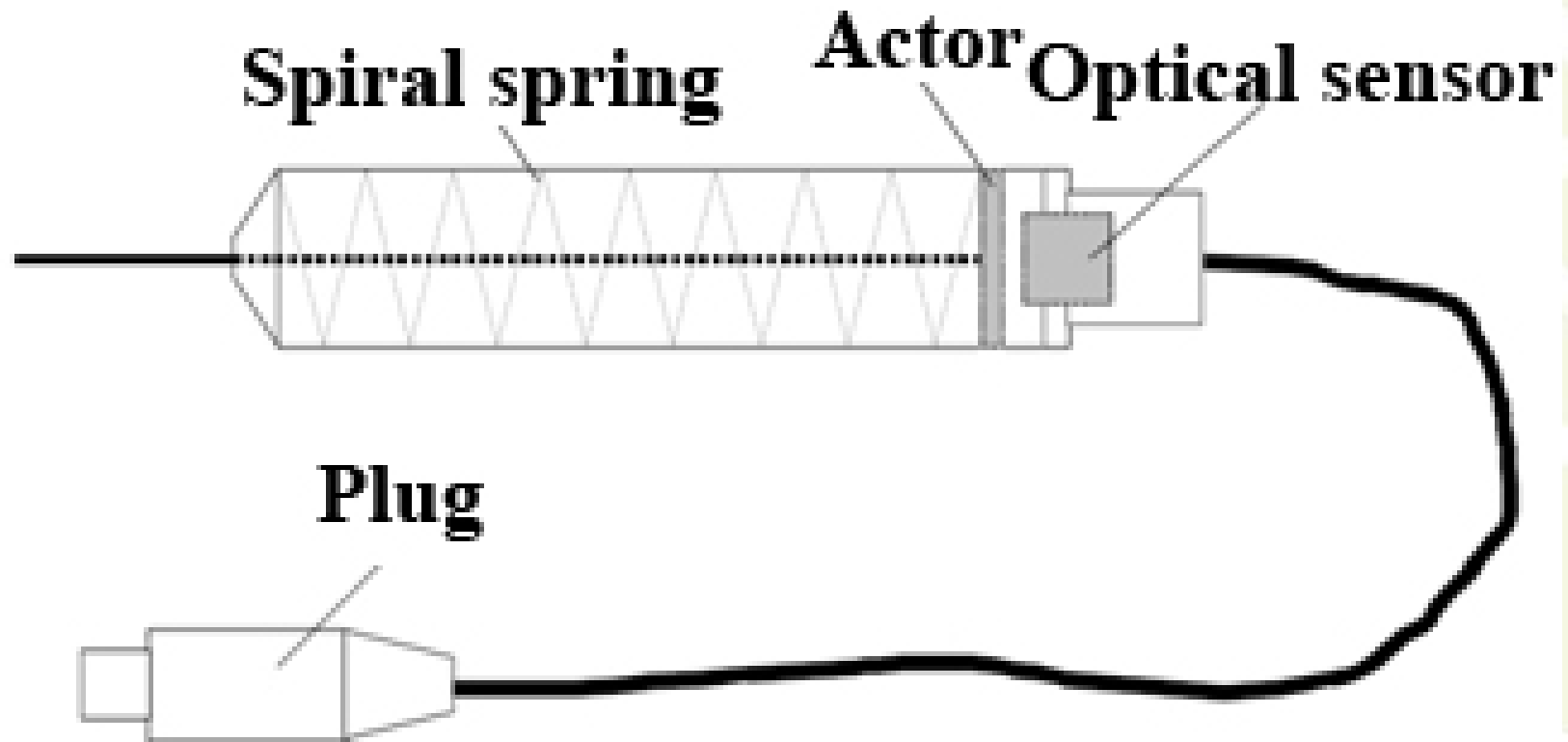
Statistics



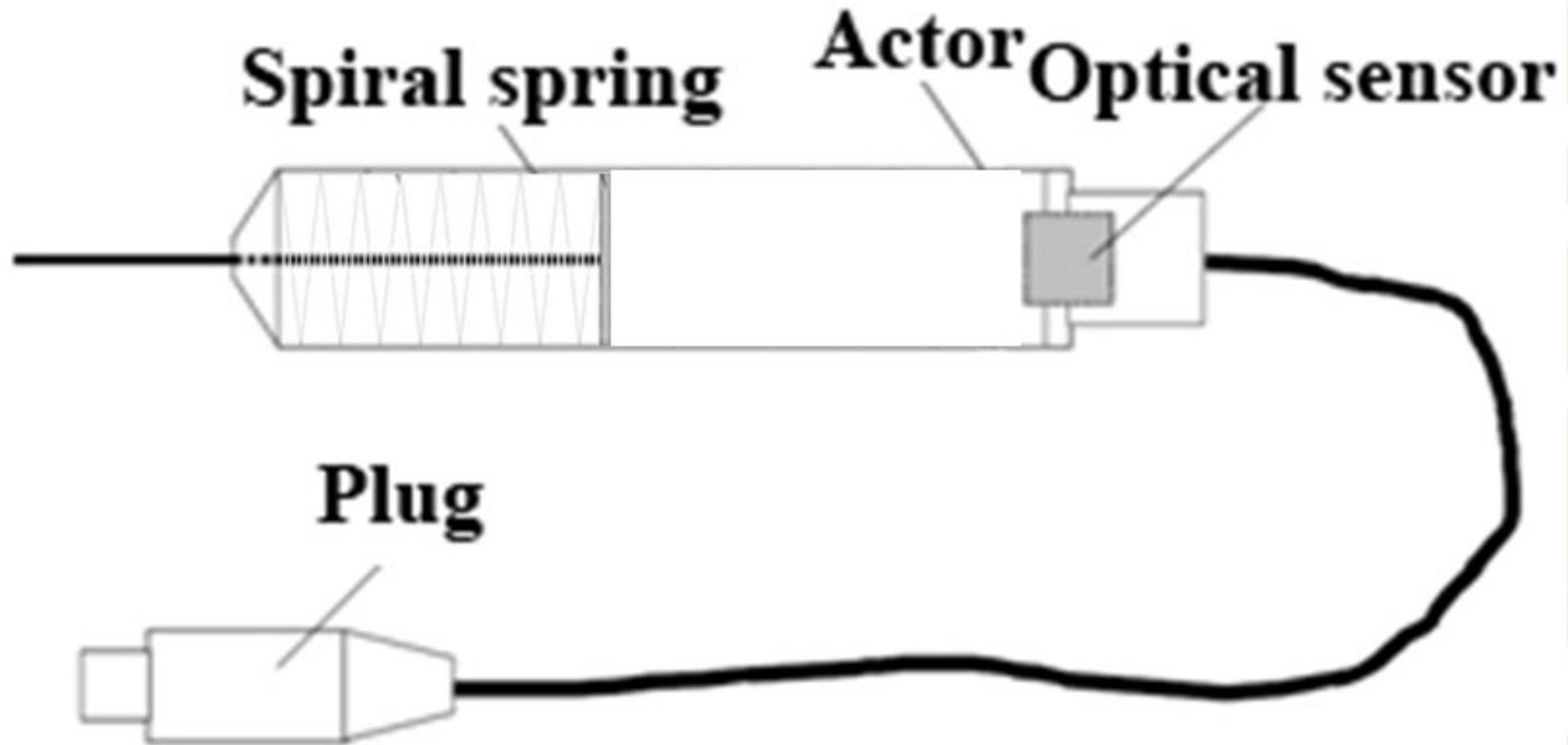
Data recording – The Halter



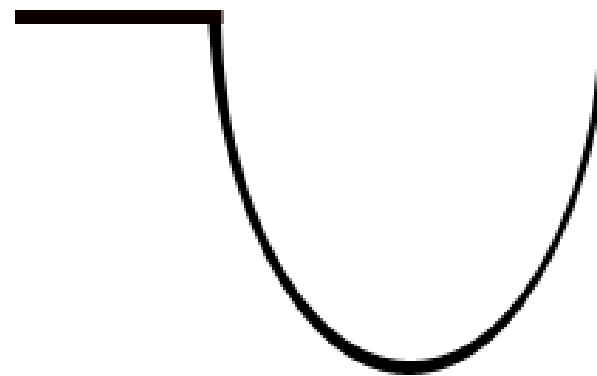
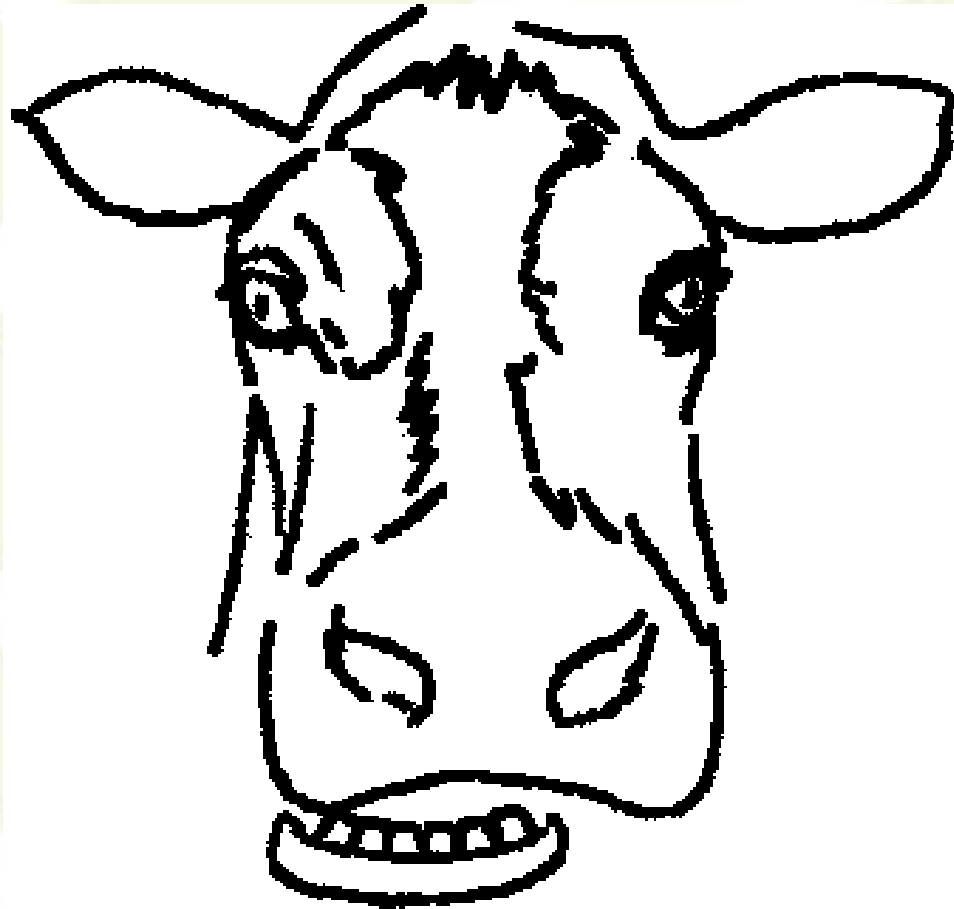
Datarecording – The Sensor



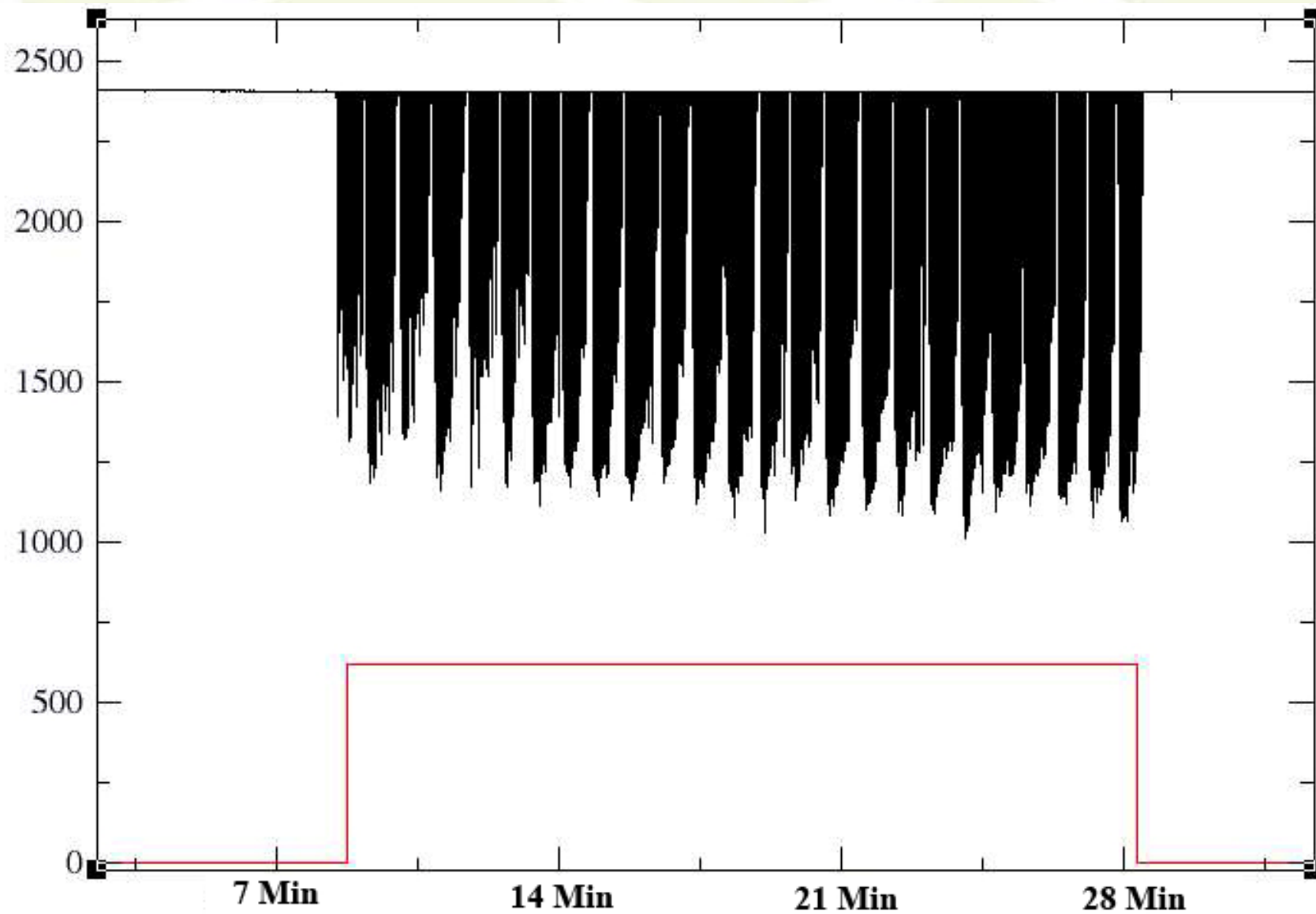
Datarecording – The Sensor



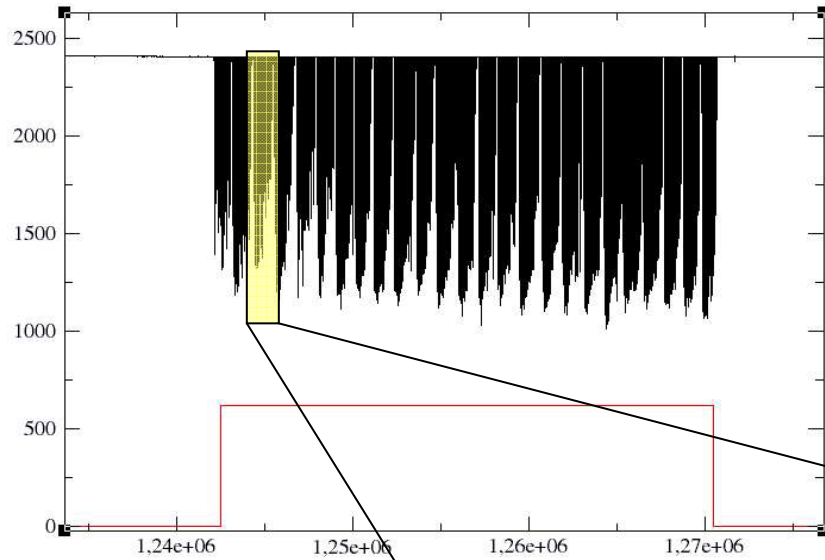
Datarecording – The Sensor



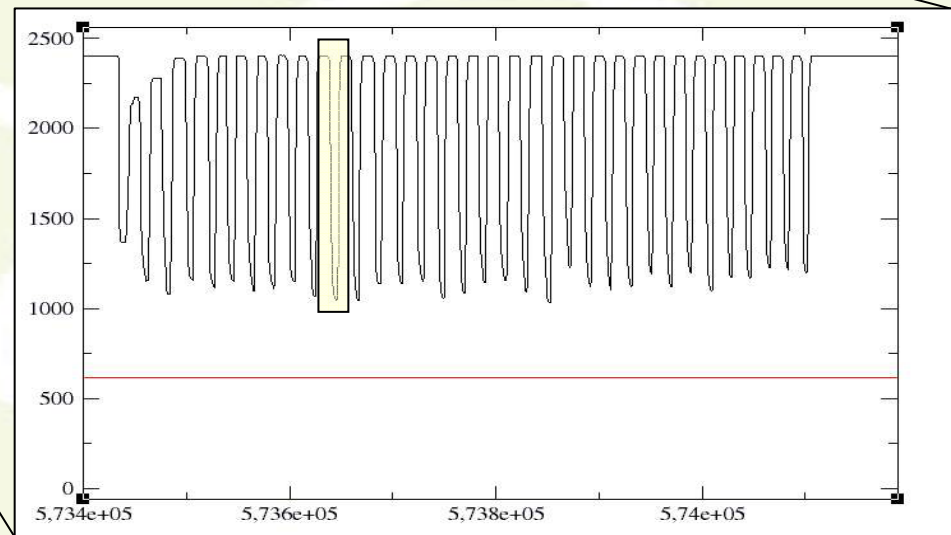
Datarecording – The Sensor



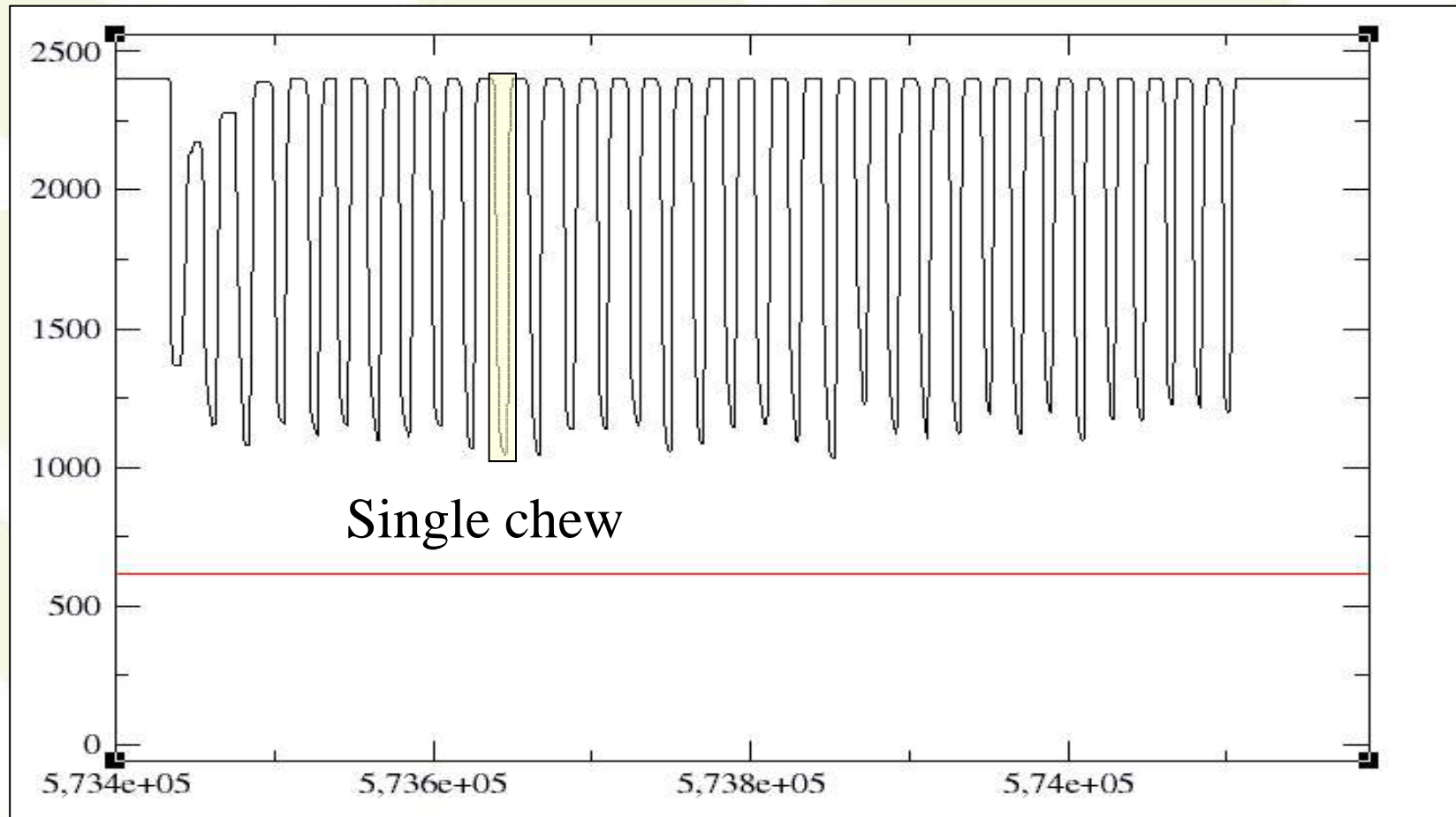
Datarecording – The Sensor



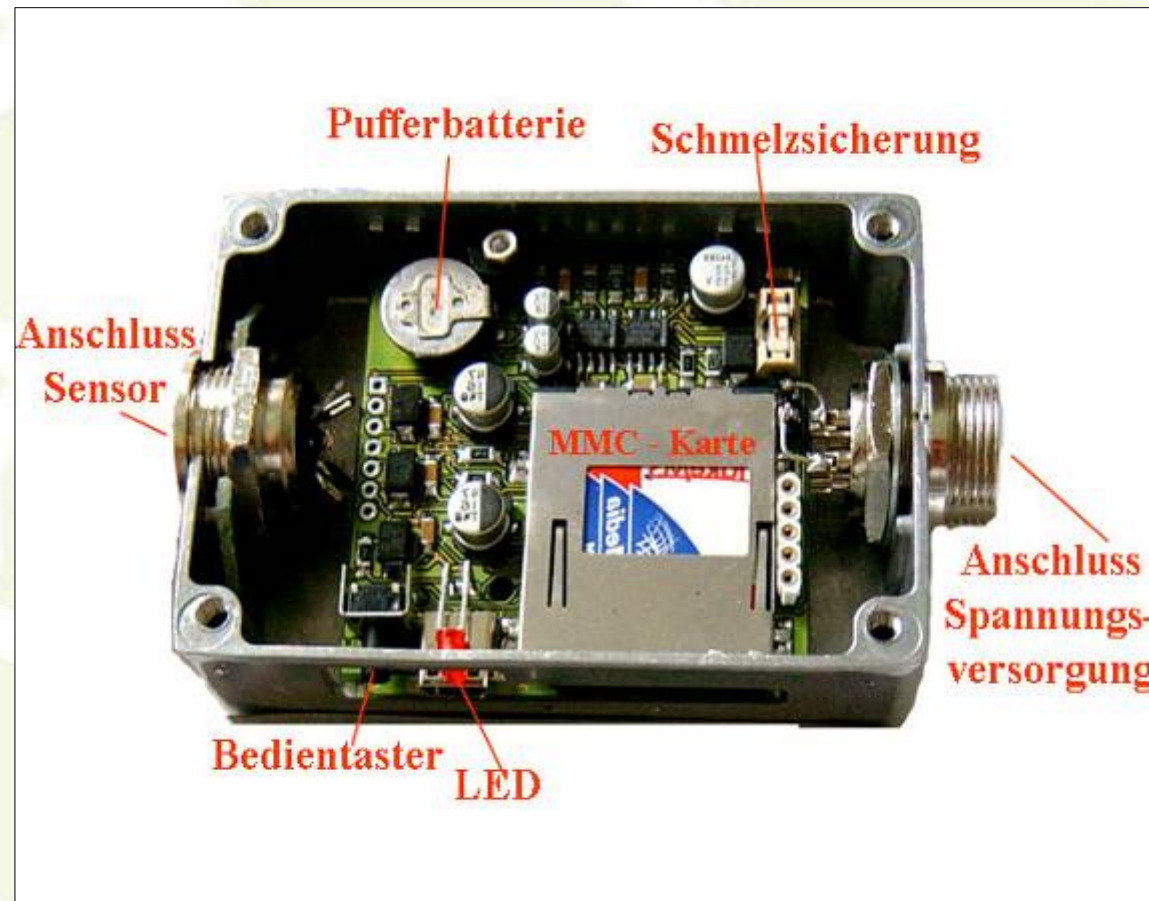
Single Bolus



Datarecording – The Sensor



Data recording – The Datalogger

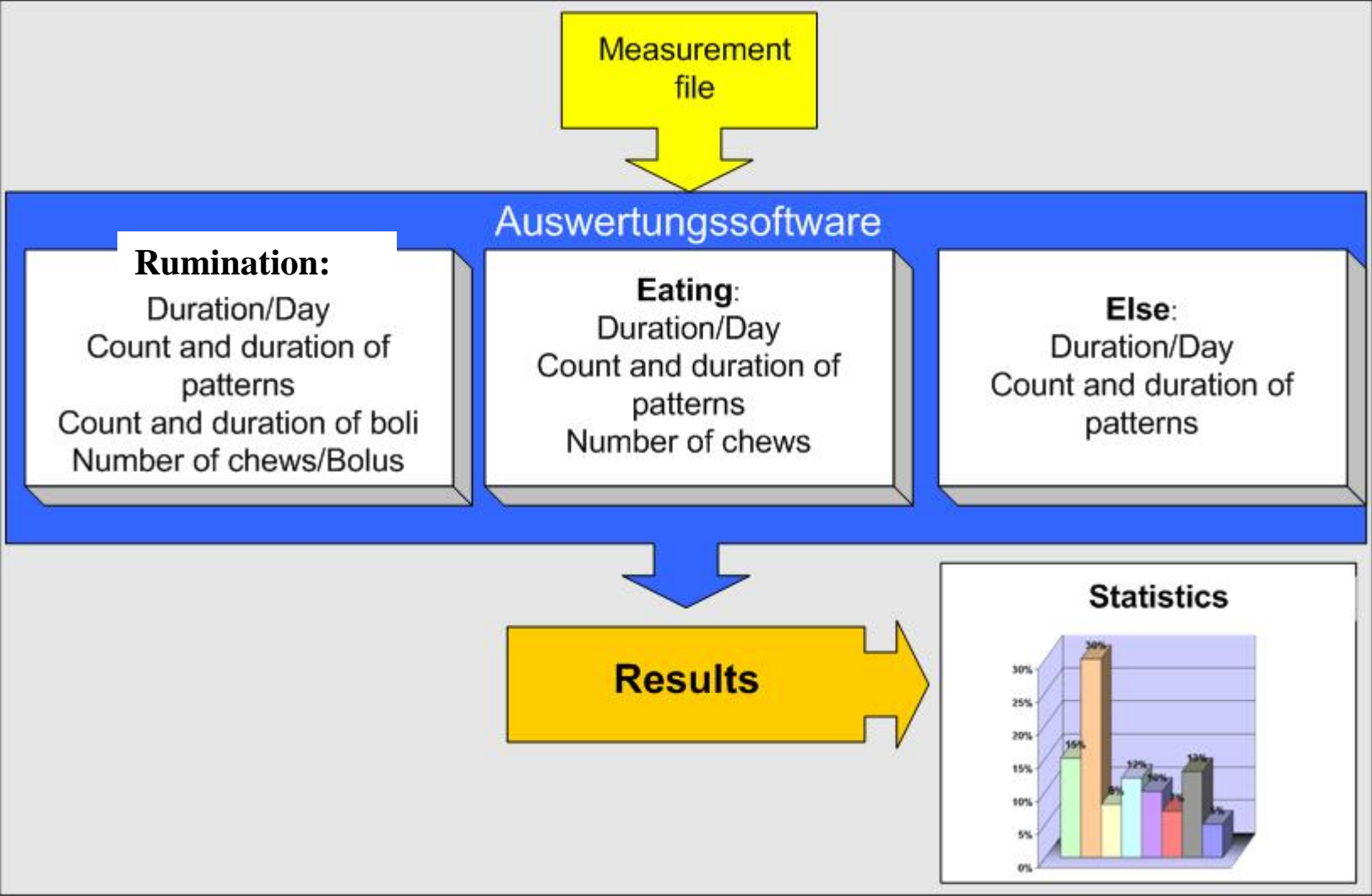


Datarecording – The Datalogger

```
STARTlogging DTLOG 1.1 180705 0001 14.06.05 07:23:16 124450 5.0V 0  
:  
:  
1120  
890  
640  
380  
180  
30  
0  
20  
:  
:  
ENDlogging DTLOG 1.0 010705 0001 14.06.05 11:29:37 122628 5.0V 0
```



Analysing Software

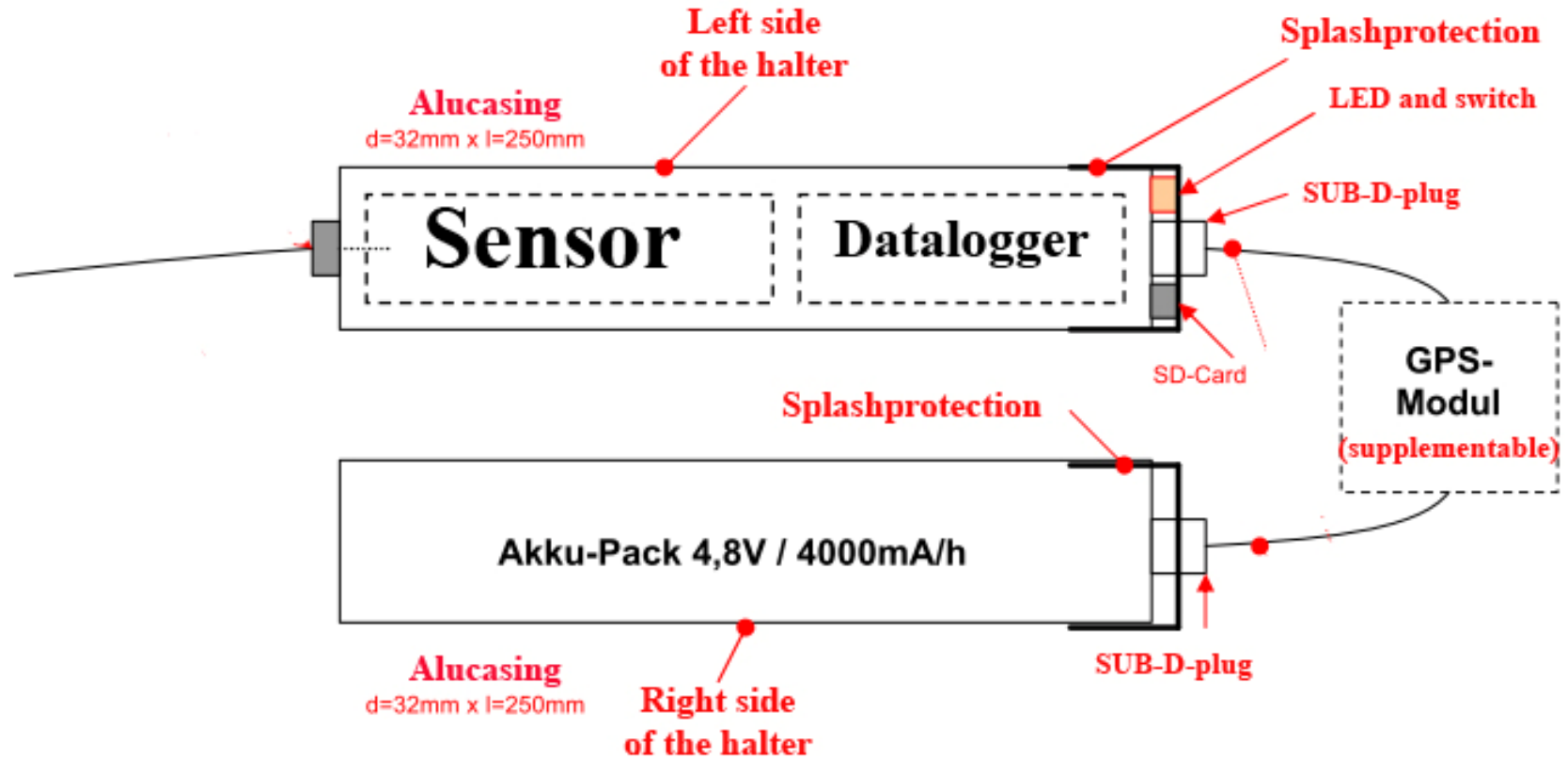


Analysing Software

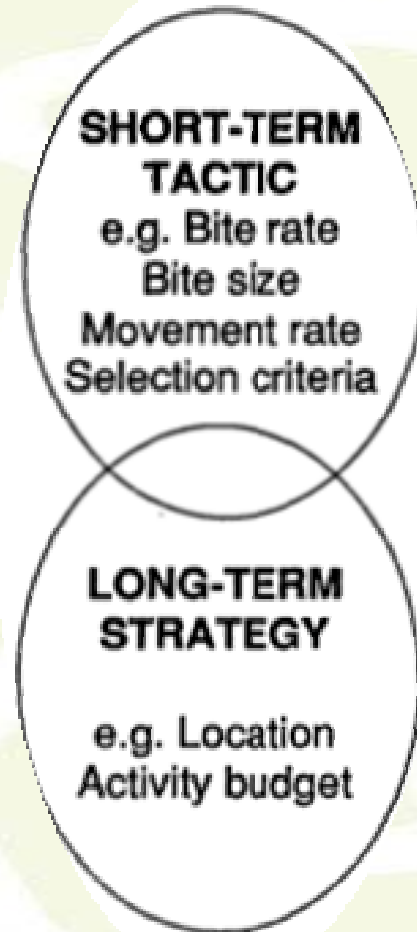
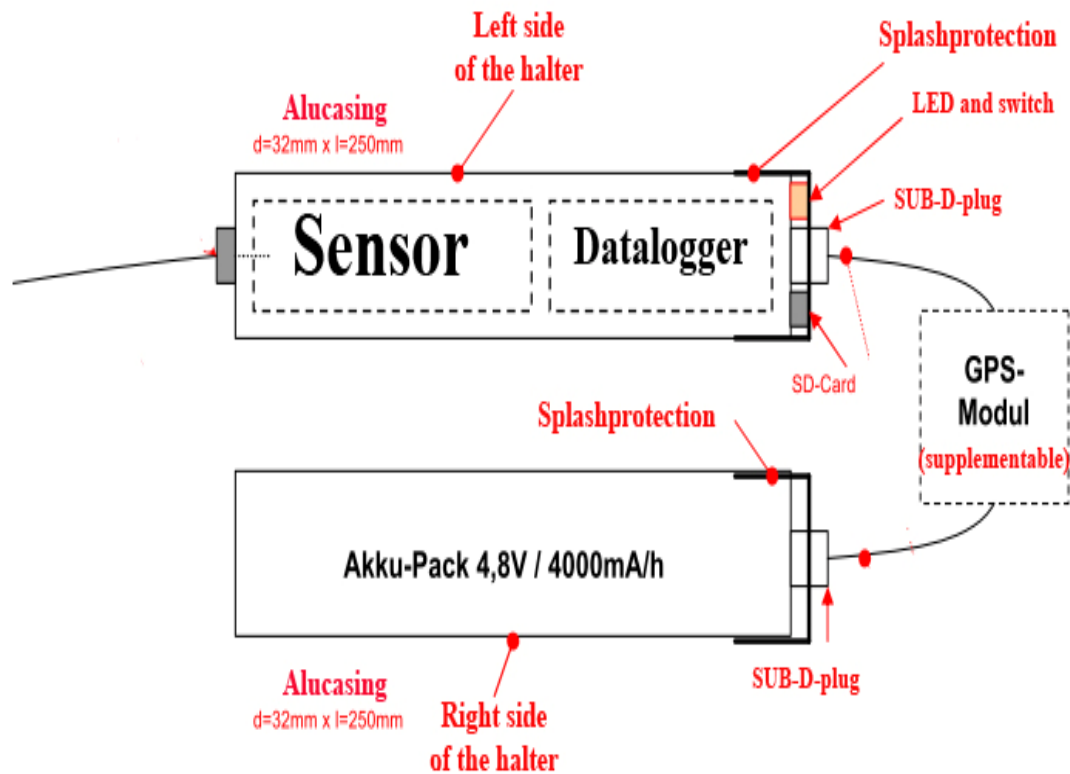
Art der Phase	Nr in 24h	Boli in Phase	Anzahl Boli	Datum	Startzeit	Datum	Endzeit	Dauer in Sek.	Datum Boli	Start Boli	Datum Boli	Ende Boli	Dauer in Sek.	Anzahl Kauschlg
F	5	0	0	11.05.2006	12:27:44	11.05.2006	12:32:50	305,7	11.05.2006	12:27:44	11.05.2006	12:32:50	305,7	293
AP	9	0	0	11.05.2006	12:32:50	11.05.2006	12:38:06	316,75	11.05.2006	12:32:50	11.05.2006	12:38:06	316,75	0
AA	4	0	0	11.05.2006	12:38:06	11.05.2006	12:38:13	38723	11.05.2006	12:38:06	11.05.2006	12:38:13	38723	4
AP	10	0	0	11.05.2006	12:38:13	11.05.2006	12:44:39	386,6	11.05.2006	12:38:13	11.05.2006	12:44:39	386,6	0
AA	5	0	0	11.05.2006	12:44:39	11.05.2006	12:44:53	14,25	11.05.2006	12:44:39	11.05.2006	12:44:53	14,25	12
AP	11	0	0	11.05.2006	12:44:54	11.05.2006	13:01:41	1007,2	11.05.2006	12:44:54	11.05.2006	13:01:41	1007,2	0
AA	6	0	0	11.05.2006	13:01:41	11.05.2006	13:01:51	42278	11.05.2006	13:01:41	11.05.2006	13:01:51	42278	12
AP	12	0	0	11.05.2006	13:01:51	11.05.2006	13:18:56	1025,5	11.05.2006	13:01:51	11.05.2006	13:18:56	1025,45	0
WP	1	0	36	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,05	2051
W	1	1	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:19:37	11.05.2006	13:20:03	38954	19
W	1	2	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:20:08	11.05.2006	13:20:57	48,45	34
W	1	3	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:21:02	11.05.2006	13:25:17	254,75	227
W	1	4	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:25:23	11.05.2006	13:26:11	48,7	47
W	1	5	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:26:17	11.05.2006	13:29:21	184,5	162
W	1	6	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:29:27	11.05.2006	13:30:15	48,4	49
W	1	7	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:30:20	11.05.2006	13:31:15	54,55	51
W	1	8	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:31:20	11.05.2006	13:32:09	48,45	45
W	1	9	0	11.05.2006	13:18:56	11.05.2006	14:00:55	2518,1	11.05.2006	13:32:15	11.05.2006	13:32:58	43,7	43



New Design To Measure Grazing Behaviour



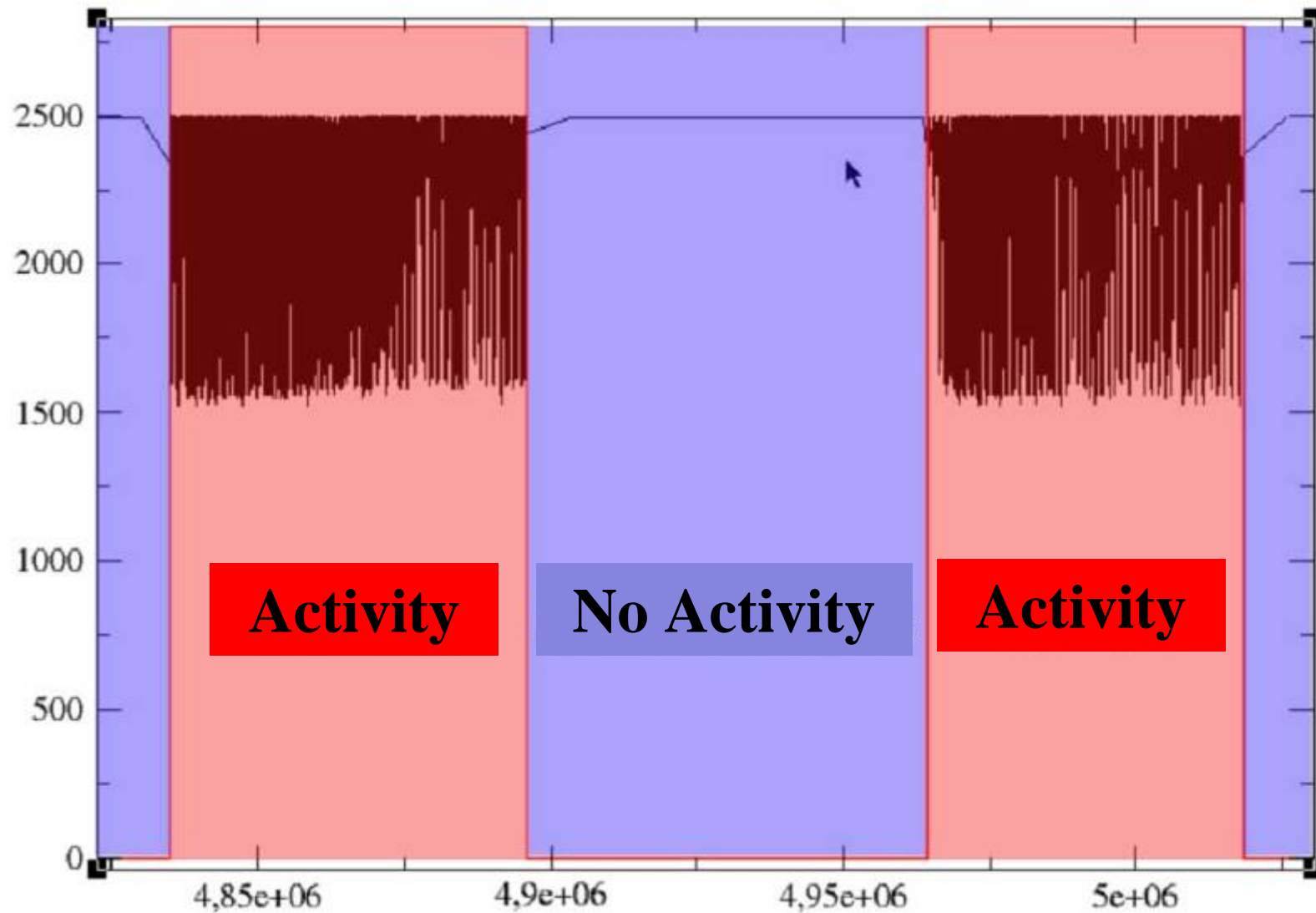
New Design To Measure Grazing Behaviour



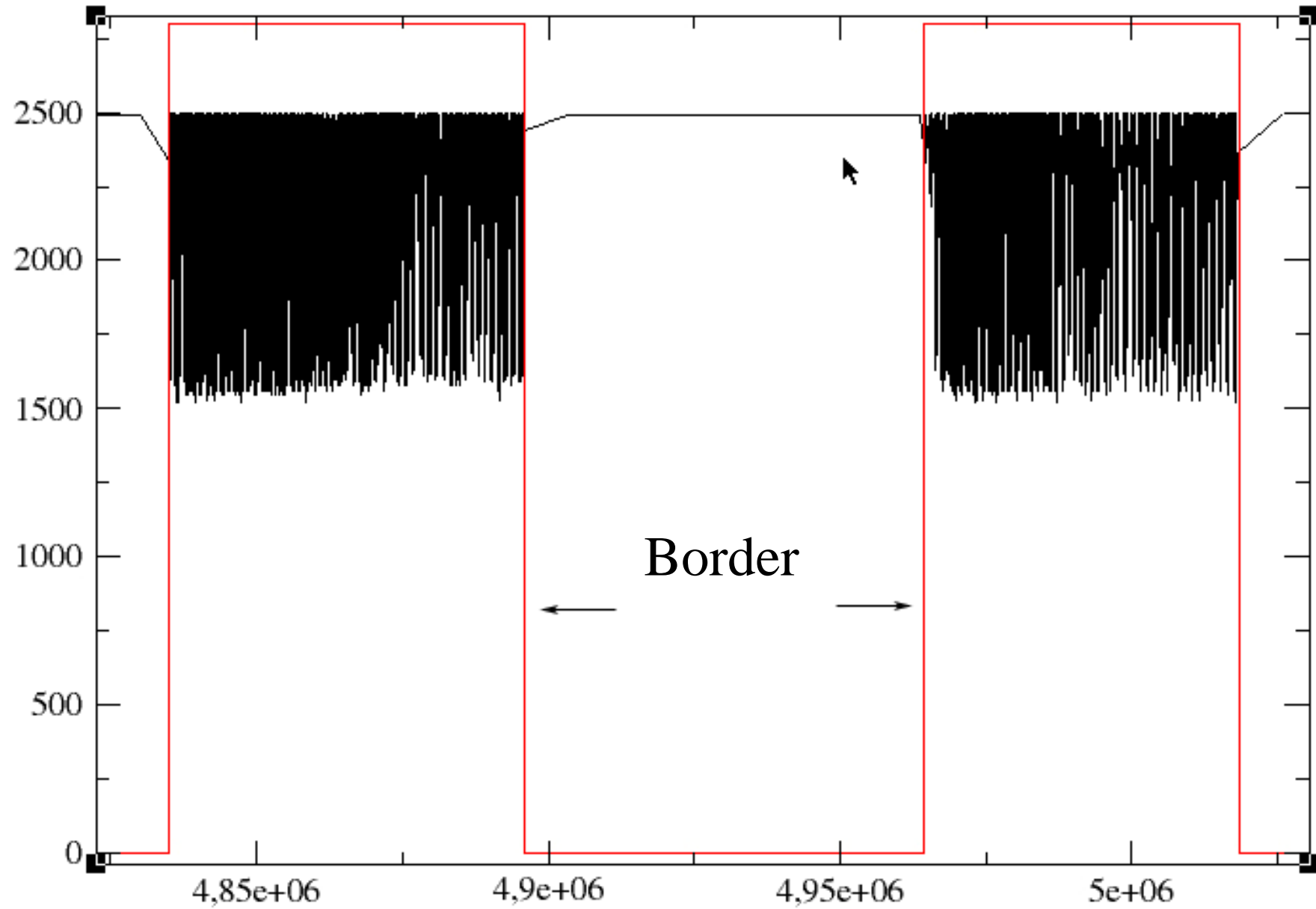
Thank you for your attention!



Analysing Software



Analysing Software



Die Auswertungssoftware

