SUPPLEMENTARY MATERIAL: COMPLEMENTARY VARIABLES ANALYSIS

For each experiment, a qualitative analysis of the influence of complementary variables was conducted.

I. EXPERIMENT 1

A. Identification of type of jaw movement (B, C, CB) for each animal species separately (2 models, one per animal species)

The CB sound had a longer D than other types of jaw movement in both ruminant species ($P \leq 0.001$). Whereas duration of B and C did not differ significantly for sheep, in cows B events were shorter than C events (Table A1). In all jaw movements the FSP where the peak occurs was similar in cows ($P = 0.123$), but in sheep the peak of C was detected in a frequency band significantly higher ($P \leq 0.001$) than B and CB. The C events presented the lowest TE values in sheep ($P \leq 0.001$), whereas the opposite was observed in cows, where C showed the highest values ($P \leq 0.001$). While in cows C showed the highest MPA, in sheep there were no significant differences ($P = 0.06$) between three types of jaw movements. In both sheep and cows, D was the only variable selected in all the partitions for discriminant analysis using EB with C_V model. The MPA was important in cows, participating in all cases, but was not the same in sheep. The FSP was selected in half of the sheep partitions but never in cows. The TE was never selected as a meaningful variable.

II. EXPERIMENT 2

A. Comparison of types of jaw movements within plant species

Except for alfalfa, B events were the shortest and CB the longest ($P \leq 0.001$, Table A2). Bites produced the peak energy at a lower FSP frequency ($P = 0.023$) than C and CB. There were no significant differences in TE ($P = 0.137$) within species. Chews produced the highest MPA peak in all pasture species ($P \leq 0.001$). Event duration D was the main and only complementary variable selected to identify type of jaw movement, except for alfalfa, where MPA was also selected.

B. Comparison of each type of jaw movements across plant species

Bites were longest in alfalfa and shortest in oats ($P \leq 0.001$). Chew-bite events were longest ($P \leq 0.001$) in oats and shortest in white clover and alfalfa. There were no significant differences in the FSP among the pastures considered for any type of jaw movement. All types of jaw movement were significantly different in TE among plant species. White clover produced the highest MPA for all jaw movements ($P \leq 0.001$). Discriminant analysis selected D and TE as the main complementary variables for models considering all covariates. MPA was also included in the discrimination of B and FSP in the discrimination of CB.

C. Simultaneous identification of jaw movements and pasture species

Event duration (D) was the most important variable in the discrimination of the 12 classes (3 jaw movement types x 4 plant species). Peak amplitude (MPA) was also included in the discrimination function.

III. EXPERIMENT 3

A. Comparison of chewing during rumination or grazing within pasture species

Chewing during grazing was significantly shorter ($P = 0.022$) than during rumination for alfalfa (Table A3), but differences were not significant in annual ryegrass ($P = 0.412$). Chewing during rumination in alfalfa produced a peak of energy in a lower FSP ($P \leq 0.001$) than during grazing, but the difference was not significant in annual ryegrass ($P = 133$). TE was lowest in annual ryegrass grazing ($P \leq 0.001$), and it was the only complementary variable selected for discrimination from the C_V group.

B. Comparison of types of jaw movements in two pasture species

Bites were the shortest (Table A4), CB were the longest events ($P \leq 0.001$). Bites had power peaks at lower FSP frequency ($P = 0.001$) than C and CB. Within each species, all jaw movements had similar TE ($P = 0.452$), but all B, C and CB in alfalfa had higher TE than in annual ryegrass ($P \leq 0.001$). Chewing events produced the highest MPA energy in both pasture species

($P \leq 0.001$), and for each type of jaw movement, MPA was higher in alfalfa than in annual ryegrass ($P \leq 0.001$). Although it did not improve the classification, TE was selected to discriminate CB; for the other types of jaw movements models with EB only or EB with C_V achieved the same accuracy.

Tables

TABLE A1. Test of differences among types of jaw movements and grazing animal species cows and sheep (Experiment 1). D is event duration, FSP is frequency of peak power, TE is total energy and MPA is amplitude of peak power. Lack of common letters between any two cells within variables denotes a significant difference between the means (Tukey-Kramer HSD, P<0.05). Values are ranked from highest (a) to lowest (d).

Variable		B	C	CB
D(ms)	Cows	c	b	**a**
	Sheep	c	c	b
FSP(Hz)	Cows	b	bc	b
	Sheep	d	**a**	cd
TE	Cows	b	**a**	b
	Sheep	c	d	c
MPA	Cows	b	**a**	b
	Sheep	b	b	b

TABLE A2. Test of differences among types of jaw movements and forage species (Experiment 2). D is event duration, FSP is frequency of peak power, TE is total energy and MPA is amplitude of peak power. Lack of common letters between any two cells within variables denotes a significant difference between the means (Tukey-Kramer HSD, P<0.05). Values are ranked from highest (a) to lowest (d).

Variable		B	C	CB
D(ms)	Alfalfa	b	ef	c
	Fescue	fg	cd	b
	Oats	g	de	**a**
	Clover	fg	gh	c
FSP(Hz)	Alfalfa	b	a	**a**
	Fescue	b	a	**a**
	Oats	b	a	**a**
	Clover	b	a	**a**
TE	Alfalfa	b	b	b
	Fescue	d	d	d
	Oats	c	c	c
	Clover	**a**	**a**	**a**
MPA	Alfalfa	e	ab	de
	Fescue	cde	bcd	e
	Oats	de	bcd	e
	Clover	ab	**a**	bc

TABLE A3. Test of differences between grazing and rumination chews in different pasture species (Experiment 3). D is event duration, FSP is frequency of peak power, TE is total energy and MPA is amplitude of peak power. Lack of common letters between any two cells within variables denotes a significant difference between the means (Tukey-Kramer HSD, $P<0.05$). Values are ranked from highest (a) to lowest (d).

Variable		Grazing	Rumination
D(ms)	Alfalfa	c	**a**
	Ryegrass	bc	b
FSP(Hz)	Alfalfa	**a**	b
	Ryegrass	**a**	**a**
TE	Alfalfa	**a**	**a**
	Ryegrass	b	**a**
MPA	Alfalfa	**a**	**a**
	Ryegrass	b	b

TABLE A4. Test of differences among types of jaw movements and forage species (Experiment 3). D is event duration, FSP is frequency of peak power, TE is total energy and MPA is amplitude of peak power. Lack of common letters between any two cells within variables denotes a significant difference between the means (Tukey-Kramer HSD, $P<0.05$). Values are ranked from highest (a) to lowest (d).

Variable		B	C	CB
D(ms)	Alfalfa	c	b	**a**
	Ryegrass	c	b	**a**
FSP(Hz)	Alfalfa	c	b	ab
	Ryegrass	c	b	ab
TE	Alfalfa	**a**	**a**	**a**
	Ryegrass	b	b	b
MPA	Alfalfa	b	**a**	b
	Ryegrass	c	b	c