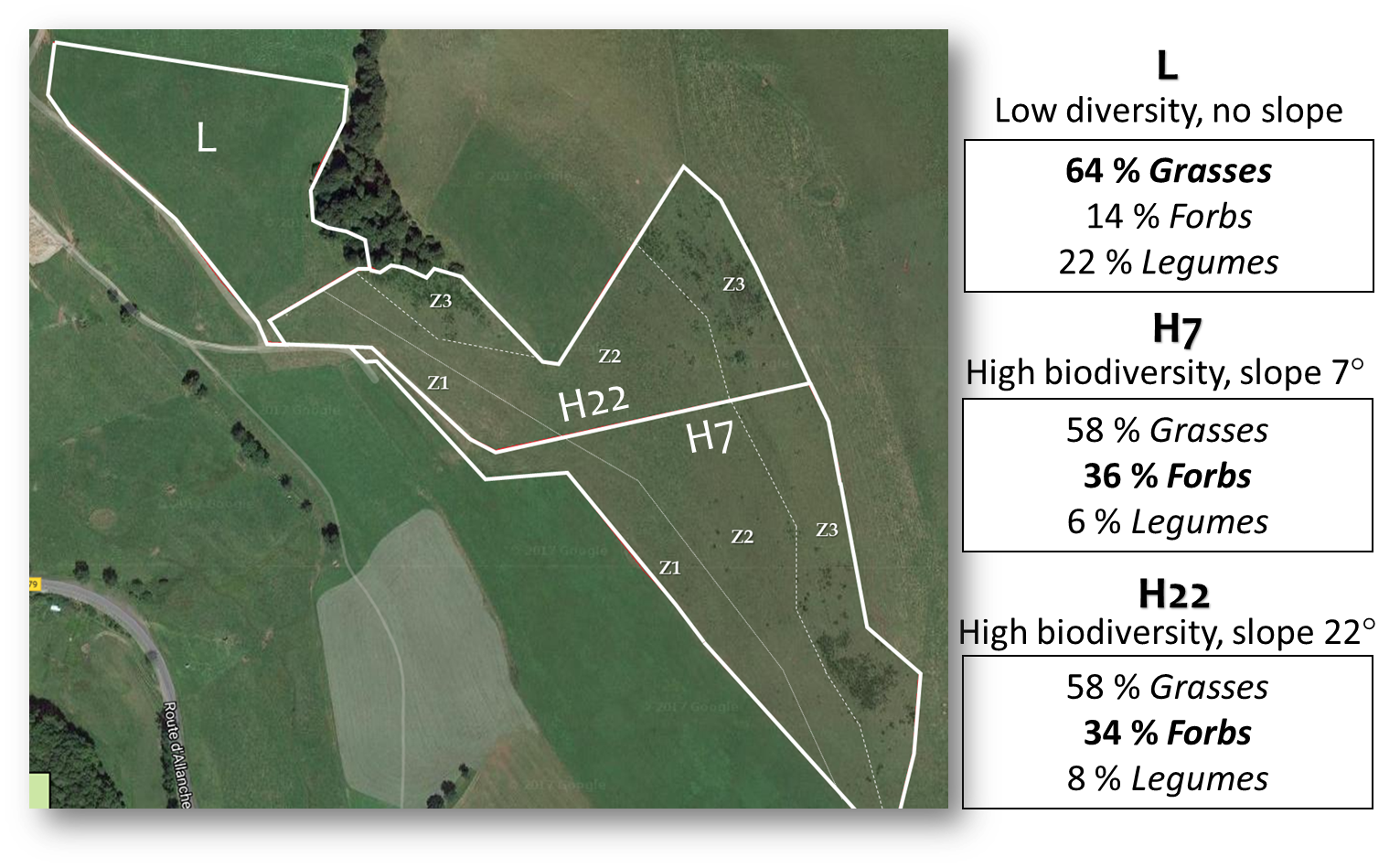
**Supplementary material**

*Animal*

**Grazing behaviour of dairy cows on biodiverse mountain pastures is more influenced by slope than cow breed**

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**Supplementary Figure S1.** *Map of the cows’ experimental pasture areas (2 cm = 100 m) and zones (Z1, Z2, Z3) in the high biodiversity areas.*

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**Supplementary Table S1.** *Characterisation of the swards by pasture type (low/high diversity (div.) and average slopes) during each cows’ grazing period (arithmetic means and standard error of the mean).*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Grazing period | Early 1st grazing | | |  | Late 1st grazing | | |  | Early 2nd grazing | | |  |
| Pasture type | Low div. 2° | High div. 7° | High div. 22° |  | Low div. 2° | High div. 7° | High div. 22° |  | Low div. 2° | High div. 7° | High div. 22° | SEM |
| Vegetation types theoretically available for bites (%) | | | |  |  |  |  |  |  |  |  |  |
| Short vegetative | 5 | 18 | 29 |  | 48 | 36 | 48 |  | 53 | 63 | 45 | 18.6 |
| Tall vegetative | 86 | 59 | 51 |  | 48 | 48 | 44 |  | 40 | 24 | 29 | 13.5 |
| Mature vegetation | 9 | 22 | 20 |  | 4 | 16 | 8 |  | 7 | 13 | 26 | 10.1 |
| Grasses | 68 | 66 | 62 |  | 67 | 55 | 65 |  | 57 | 52 | 42 | 9.1 |
| Legumes | 17 | 9 | 8 |  | 22 | 5 | 7 |  | 27 | 5 | 9 | 3.7 |
| Forbs | 15 | 25 | 30 |  | 10 | 41 | 28 |  | 16 | 43 | 49 | 11.8 |
| Sward composition (g/kg DM) | | |  |  |  |  |  |  |  |  |  |  |
| Organic matter | 900 | 939 | 926 |  | 902 | 925 | 920 |  | 901 | 922 | 910 | 3.7 |
| CP | 156 | 103 | 115 |  | 123 | 83 | 82 |  | 153 | 89 | 93 | 7.0 |
| NDF | 581 | 601 | 606 |  | 609 | 602 | 641 |  | 590 | 645 | 647 | 25.5 |
| ADF | 274 | 307 | 293 |  | 312 | 335 | 342 |  | 301 | 341 | 339 | 9.2 |
| Nutritional value |  |  |  |  |  |  |  |  |  |  |  |  |
| Digestibility | 0.702 | 0.635 | 0.651 |  | 0.645 | 0.583 | 0.585 |  | 0.649 | 0.559 | 0.567 | 0.013 |
| NEL (MJ/kg DM) | 5.6 | 5.1 | 5.2 |  | 5.0 | 4.5 | 4.5 |  | 5.1 | 4.3 | 4.3 | 0.11 |
| PDIE (g/kg DM) | 92.0 | 79.3 | 82.0 |  | 82.0 | 70.0 | 69.0 |  | 88.0 | 69.0 | 69.3 | 3.26 |
| PDIN (g/kg DM) | 103.0 | 68.0 | 76.3 |  | 81.0 | 55.3 | 54.3 |  | 102.0 | 59.0 | 61.3 | 6.43 |

Low div. 2°: low botanical diversity, slope 2°; High div. 22°: high botanical diversity, slope 22°; High div 7°: high botanical diversity, slope 7°.

NEL: net energy for lactation; PDIE: absorbable protein at the duodenum according to supply with fermentable energy and rumen undegradable protein; PDIN: absorbable protein at the duodenum according to supply with rumen degradable protein.

**Supplementary Table S2.** *Characterisation of the zones of high diversity pastures during each cows’ grazing period (arithmetic means and* *standard error of the mean).*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Grazing period | Early 1st grazing | | |  | Late 1st grazing | | |  | Early 2nd grazing | | |  |
| Zone | Z1 (n=2) | Z2 (n=2) | Z3 (n=2) |  | Z1 (n=2) | Z2 (n=2) | Z3 (n=2) |  | Z1 (n=2) | Z2 (n=2) | Z3 (n=2) | SEM |
| Vegetation types theoretically available for bites (%) | | | |  |  |  |  |  |  |  |  |  |
| Short vegetative | 9 | 14 | 48 |  | 38 | 42 | 46 |  | 42 | 53 | 68 | 18.7 |
| Tall vegetative | 52 | 67 | 47 |  | 47 | 46 | 45 |  | 32 | 30 | 16 | 19.5 |
| Mature vegetation | 39 | 19 | 6 |  | 15 | 11 | 9 |  | 26 | 17 | 16 | 9.9 |
| Grasses | 71 | 67 | 54 |  | 67 | 54 | 58 |  | 59 | 48 | 34 | 9.4 |
| Legumes | 14 | 5 | 8 |  | 10 | 4 | 3 |  | 11 | 7 | 2 | 3.8 |
| Forbs | 15 | 28 | 38 |  | 23 | 42 | 39 |  | 29 | 45 | 64 | 10.8 |
| Sward composition (g/kg DM) | | |  |  |  |  |  |  |  |  |  |  |
| Organic matter | 935 | 930 | 932 |  | 920 | 923 | 924 |  | 916 | 919 | 914 | 11.6 |
| CP | 108 | 114 | 106 |  | 80 | 88 | 80 |  | 88 | 88 | 95 | 9.4 |
| NDF | 614 | 602 | 594 |  | 643 | 624 | 597 |  | 679 | 657 | 602 | 39.9 |
| ADF | 304 | 293 | 303 |  | 340 | 338 | 338 |  | 355 | 343 | 321 | 13.7 |
| Nutritional value |  |  |  |  |  |  |  |  |  |  |  |  |
| Digestibility | 0.640 | 0.653 | 0.636 |  | 0.585 | 0.587 | 0.580 |  | 0.551 | 0.562 | 0.578 | 0.027 |
| NEL (MJ/kg DM) | 5.2 | 5.3 | 5.1 |  | 4.5 | 4.6 | 4.5 |  | 4.2 | 4.3 | 4.5 | 0.2 |
| PDIE (g/kg DM) | 80 | 83 | 79 |  | 69 | 71 | 68.5 |  | 67.5 | 69 | 71 | 4.0 |
| PDIN (g/kg DM) | 71 | 76 | 69.5 |  | 53 | 59 | 52.5 |  | 58.5 | 58.5 | 63.5 | 6.5 |

Low div. 2°: low botanical diversity, slope 2°; High div. 22°: high botanical diversity, slope 22°; High div 7°: high botanical diversity, slope 7°.

NEL: net energy for lactation; PDIE: absorbable protein at the duodenum according to supply with fermentable energy and rumen undegradable protein; PDIN: absorbable protein at the duodenum according to supply with rumen degradable protein.

**Supplementary Table S3.** *Least Square means for overall effects on cow’s behaviour, diet selection, faecal composition and performance.*\*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Pasture type | | |  | Grazing period | | |  |
|  | Low div. 2° | High div. 7° | High div. 22° |  | Early  1st grazing | Late  1st grazing | Early  2nd grazing | SEM |
| Time allocated to activities (%) |  |  |  |  |  |  |  |  |
| Resting time | 32 | 34 | 37 |  | 45a | 37b | 21c | 2.0 |
| Grazing time | 59 | 53 | 57 |  | 47b | 53b | 69a | 2.0 |
| Other activities | 9b | 13a | 6b |  | 8 | 10 | 9 | 1.9 |
| Time spent in Z1 | ‒ | 40a | 27b |  | 45a | 32b | 24c | 1.6 |
| Time spent in Z2 | ‒ | 29b | 48a |  | 51a | 25c | 40b | 2.0 |
| Time spent in Z3 | ‒ | 30a | 24b |  | 3c | 43a | 36b | 5.1 |
| Vegetation types in the bites (%) |  |  |  |  |  |  |  |  |
| Short vegetation | 42c | 59a | 52b |  | 27c | 51b | 75a | 6.1 |
| Tall vegetation | 44a | 33b | 41a |  | 62a | 35b | 22c | 2.0 |
| Mature vegetation | 13a | 8b | 6b |  | 12a | 14a | 2b | 2.1 |
| Grasses | 77a | 71b | 67b |  | 74 | 72 | 70 | 1.4 |
| Legumes | 16a | 2c | 4b |  | 7ab | 6b | 9a | 1.6 |
| Forbs | 8b | 27a | 29a |  | 19 | 22 | 22 | 3.1 |
| Jacob’s index of selectivity (-1 < IS < 1) | |  |  |  |  |  |  |  |
| Short vegetation | 0.25b | 0.46a | 0.36ab |  | 0.50a | 0.12b | 0.45a | 0.090 |
| Tall vegetation | -0.32b | -0.21ab | -0.10a |  | -0.17 | -0.23 | -0.23 | 0.045 |
| Mature vegetation | 0.13a | -0.54b | -0.55b |  | -0.29b | 0.09a | -0.76c | 0.145 |
| Grasses | 0.31 | 0.26 | 0.19 |  | 0.14b | 0.22b | 0.40a | 0.032 |
| Legumes | -0.22a | -0.41b | -0.40b |  | -0.35ab | -0.41b | -0.27a | 0.070 |
| Forbs | -0.38b | -0.19a | -0.12a |  | -0.06a | -0.21b | -0.42c | 0.036 |
| Faeces composition (g/kg DM) |  |  |  |  |  |  |  |  |
| CP | 136a | 125b | 127b |  | 145a | 116c | 126b | 2.1 |
| ADF | 328b | 349a | 351a |  | 338b | 351a | 338b | 4.7 |
| Calculated OMD† | 0.717a | 0.697b | 0.698b |  | 0.725a | 0.683c | 0.703b | 0.003 |
| Milk (kg) | 14.3a | 12.3b | 13.2b |  | 17.2a | 12.6b | 9.9c | 0.28 |
| Δ Milk yield (kg) | -1.9a | -3.3b | -3.1b |  | 0.1a | -3.9b | -4.6b | 0.29 |
| Milk fat (g) | 571a | 483b | 517b |  | 681a | 485b | 405c | 12.7 |
| Milk protein (g) | 457a | 397b | 411b |  | 567a | 386b | 312c | 18.4 |
| BW (kg) | 613 | 617 | 610 |  | 618a | 615ab | 608b | 4.8 |

Low div. 2°: low botanical diversity, slope 2°; High div. 22°: high botanical diversity, slope 22°; High div 7°: high botanical diversity, slope 7°.  
*P*-values are reported in Table 2. a-c Within same trait and effect, values without common superscripts differ. †Organic matter digestibility