Supplementary materials

Supplementary Table 1. *Mean alkane, long-chain alcohol (LCOH) and long-chain fatty acid (LCFA) concentrations (mg/kg DM) of the vegetation components consumed by sheep in each month*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 　 | 　 | Alkanes | 　 | 　 | LCOH | 　 | 　 | 　 | 　 | 　 | LCFA | 　 | 　 | 　 | 　 | 　 |
| Month | 　 | C27 | C29 | C31 | C20 | C22 | C24 | C26 | C28 | C30 | C20 | C22 | C24 | C26 | C28 | C30 |
|  | *L. chinensis* | 57 | 55 | 89 | 43  | 35  | 111  | 51  | 438  | 189  | 85  | 123  | 218  | 61  | 94  | 106  |
|  | *C. duriuscula* | 21 | 227 | 354 | 33  | 44  | 68  | 138  | 537  | 953  | 299  | 85  | 100  | 102  | 55  | 59  |
| June | *A. scoparia* | 18 | 88 | 90 | 72  | 354  | 673  | 158  | 213  | 213  | 214  | 329  | 318  | 163  | 228  | 103  |
|  | *P. communis*  | 48 | 50 | 17 | 61  | 68  | 55  | 195  | 3035  | 3680  | 107  | 92  | 133  | 117  | 215  | 91  |
|  | *S. krylovii* | 65 | 204 | 1692 | 30  | 49  | 35  | 170  | 3831  | 322  | 113  | 120  | 145  | 55  | 153  | 160  |
|  | *T. mongolicum* | 75 | 69 | 51 | 40  | 48  | 52  | 227  | 438  | 468  | 124  | 135  | 175  | 79  | 355  | 321  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *L. chinensis* | 40 | 120 | 1134 | 23  | 41  | 33  | 123  | 3235  | 209  | 96  | 112  | 126  | 55  | 125  | 117  |
|  | *C. duriuscula* | 18 | 176 | 338 | 38  | 42  | 48  | 88  | 384  | 690  | 325  | 130  | 191  | 47  | 73  | 112  |
| July | *A. scoparia* | 23 | 78 | 75 | 50  | 284  | 608  | 162  | 351  | 266  | 317  | 515  | 461  | 166  | 164  | 90  |
|  | *P. communis*  | 34 | 22 | 9 | 63  | 75  | 51  | 209  | 2286  | 2959  | 109  | 91  | 116  | 96  | 117  | 38  |
|  | *S. krylovii* | 17 | 24 | 62 | 35  | 30  | 68  | 55  | 310  | 152  | 99  | 150  | 259  | 69  | 88  | 150  |
|  | *T. mongolicum* | 43 | 98 | 44 | 30  | 38  | 43  | 320  | 557  | 409  | 136  | 215  | 294  | 111  | 316  | 384  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *L. chinensis* | 14  | 26  | 58  | 21  | 25  | 52  | 33  | 347  | 137  | 117  | 168  | 277  | 82  | 119  | 202  |
|  | *C. duriuscula* | 15  | 149  | 297  | 20  | 24  | 29  | 63  | 351  | 711  | 330  | 146  | 207  | 48  | 73  | 111  |
| August | *A. scoparia* | 60  | 95  | 104  | 121  | 353  | 559  | 144  | 293  | 318  | 257  | 515  | 457  | 152  | 216  | 116  |
|  | *P. communis*  | 45  | 79  | 28  | 59  | 71  | 64  | 261  | 2920  | 2094  | 136  | 92  | 120  | 147  | 324  | 175  |
|  | *S. krylovii* | 38  | 136  | 1158  | 28  | 54  | 42  | 164  | 3773  | 339  | 121  | 141  | 151  | 59  | 159  | 191  |
| 　 | *T. mongolicum* | 57  | 118  | 78  | 26  | 34  | 45  | 340  | 639  | 440  | 160  | 223  | 277  | 99  | 311  | 397  |

Supplementary Table 2. *The faecal alkane, alcohol and fatty acids recovery rates (mean ± SE，n=6) of sheep*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Alkanes | Recovery rate | LCOH | recovery rate | LCFA | Recovery rate |
| C27 | 0.72±0.031 | C20 | 0.71±0.063 | C20 | 0.59±0.010 |
| C29 | 0.76±0.022 | C22 | 0.82±0.054 | C22 | 0.63±0.021 |
| C31 | 0.77±0.021 | C24 | 0.47±0.011 | C24 | 0.70±0.013 |
|  |  | C26 | 0.75±0.012 | C26 | 0.96±0.035 |
|  |  | C28 | 0.82±0.023 | C28 | 1.28±0.042 |
| 　 | 　 | C30 | 0.87±0.025 | C30 | 1.09±0.064 |

Supp. Fig. 1 Two-dimensional plot of the first two components from a principle component analysis (PC1 and PC2) of combination of the three markers (e.g. alkanes, long-chain alcohols and long-chain fatty acids) used for diet composition determination in (*a*) June (alkane + LCOH), (*b*) July (alkane+LCOH) and (*c*)August (alkane+LCOH )



(*b*)

(*a*)

(*c*)

Supp. Fig. 1.