**Table S2.** Number and relative synonymous codon usage(RSCU) of codons in six *Sanicula* species

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Amino acid** | **Codon** | **Number** | | | | | | **RSCU** | | | | | |
| ***S.***  ***rubriflora*** | ***S.***  ***flavovirens*** | ***S.***  ***lamelligera*** | ***S.***  ***orthacantha*** | ***S.***  ***giraldii*** | ***S.***  ***odorata*** | ***S.***  ***rubriflora*** | ***S. flavovirens*** | ***S. lamelligera*** | ***S. orthacantha*** | ***S.***  ***giraldii*** | ***S.***  ***odorata*** |
| Phe | UUU | 2107 | 2179 | 2141 | 2162 | 2168 | 2166 | 1.16 | 1.23 | 1.17 | 1.19 | 1.17 | 1.21 |
|  | UUC | 1515 | 1361 | 1506 | 1458 | 1529 | 1429 | 0.84 | 0.77 | 0.83 | 0.81 | 0.83 | 0.79 |
| Ser | UCU | 1185 | 1165 | 1203 | 1168 | 1281 | 1225 | 1.44 | 1.46 | 1.49 | 1.47 | 1.51 | 1.50 |
|  | UCC | 932 | 899 | 888 | 914 | 949 | 918 | 1.13 | 1.13 | 1.10 | 1.15 | 1.12 | 1.12 |
|  | UCA | 964 | 1002 | 854 | 894 | 1013 | 997 | 1.17 | 1.26 | 1.05 | 1.12 | 1.19 | 1.22 |
|  | UCG | 687 | 620 | 605 | 618 | 635 | 632 | 0.83 | 0.78 | 0.75 | 0.78 | 0.75 | 0.77 |
|  | AGU | 708 | 673 | 747 | 669 | 712 | 670 | 0.86 | 0.84 | 0.92 | 0.84 | 0.84 | 0.82 |
|  | AGC | 471 | 426 | 563 | 520 | 508 | 417 | 0.57 | 0.53 | 0.70 | 0.65 | 0.60 | 0.58 |
| Tyr | UAU | 1390 | 1431 | 1342 | 1408 | 1250 | 1290 | 1.32 | 1.36 | 1.32 | 1.35 | 1.29 | 1.30 |
|  | UAC | 712 | 666 | 687 | 674 | 683 | 701 | 0.68 | 0.64 | 0.68 | 0.65 | 0.71 | 0.70 |
| Cys | UGU | 751 | 734 | 354 | 675 | 751 | 692 | 1.23 | 1.27 | 1.11 | 1.23 | 1.23 | 1.18 |
|  | UGC | 470 | 419 | 283 | 422 | 470 | 484 | 0.77 | 0.73 | 0.89 | 0.77 | 0.77 | 0.82 |
| Leu | UUA | 986 | 1076 | 1025 | 1045 | 1181 | 1054 | 1.16 | 1.25 | 1.21 | 1.22 | 1.38 | 1.26 |
|  | UUG | 1125 | 1046 | 1058 | 1104 | 1051 | 1041 | 1.32 | 1.21 | 1.25 | 1.29 | 1.23 | 1.24 |
|  | CUU | 1064 | 1146 | 1075 | 1100 | 1035 | 1039 | 1.25 | 1.33 | 1.27 | 1.28 | 1.21 | 1.24 |
|  | CUC | 659 | 638 | 671 | 655 | 617 | 650 | 0.78 | 0.74 | 0.79 | 0.76 | 0.72 | 0.77 |
|  | CUA | 778 | 816 | 737 | 734 | 785 | 773 | 0.92 | 0.94 | 0.87 | 0.86 | 0.92 | 0.92 |
|  | CUG | 483 | 463 | 505 | 512 | 459 | 481 | 0.57 | 0.54 | 0.60 | 0.60 | 0.54 | 0.57 |
| TER | UAA | 1116 | 1067 | 1103 | 1086 | 1118 | 1063 | 1.12 | 1.09 | 1.20 | 1.16 | 1.16 | 1.10 |
|  | UGA | 1074 | 1025 | 917 | 778 | 1069 | 1053 | 1.08 | 1.05 | 1.00 | 0.83 | 1.11 | 1.09 |
|  | UAG | 806 | 845 | 733 | 934 | 700 | 785 | 0.81 | 0.86 | 0.80 | 1.00 | 0.73 | 0.81 |
| His | CAU | 854 | 976 | 944 | 908 | 840 | 873 | 1.35 | 1.41 | 1.43 | 1.41 | 1.40 | 1.37 |
|  | CAC | 413 | 408 | 373 | 381 | 362 | 397 | 0.65 | 0.59 | 0.57 | 0.59 | 0.60 | 0.63 |
| Gln | CAA | 934 | 1127 | 1036 | 1025 | 966 | 995 | 1.37 | 1.40 | 1.40 | 1.39 | 1.40 | 1.39 |
|  | CAG | 425 | 482 | 446 | 455 | 418 | 435 | 0.63 | 0.60 | 0.60 | 0.61 | 0.60 | 0.61 |
| Arg | CGU | 400 | 405 | 409 | 416 | 437 | 410 | 0.69 | 0.72 | 0.72 | 0.74 | 0.73 | 0.71 |
|  | CGC | 281 | 241 | 257 | 255 | 264 | 265 | 0.48 | 0.43 | 0.46 | 0.45 | 0.44 | 0.46 |
|  | CGA | 626 | 645 | 591 | 569 | 646 | 619 | 1.07 | 1.14 | 1.05 | 1.01 | 1.08 | 1.07 |
|  | CGG | 409 | 399 | 401 | 384 | 400 | 426 | 0.70 | 0.71 | 0.71 | 0.68 | 0.67 | 0.74 |
|  | AGA | 1120 | 1079 | 1075 | 1098 | 1175 | 1109 | 1.92 | 1.91 | 1.91 | 1.95 | 1.97 | 1.92 |
|  | AGG | 662 | 617 | 625 | 655 | 657 | 629 | 1.14 | 1.09 | 1.16 | 1.18 | 1.10 | 1.09 |
| Trp | UGG | 689 | 683 | 723 | 708 | 733 | 680 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ile | AUU | 1683 | 1654 | 1717 | 1737 | 1660 | 1651 | 1.17 | 1.22 | 1.21 | 1.22 | 1.20 | 1.18 |
|  | AUC | 1128 | 994 | 1149 | 1123 | 1054 | 1070 | 0.78 | 0.73 | 0.81 | 0.79 | 0.76 | 0.77 |
|  | AUA | 1504 | 1416 | 1402 | 1424 | 1440 | 1463 | 1.05 | 1.05 | 0.99 | 1.00 | 1.04 | 1.05 |
| Met | AUG | 904 | 781 | 828 | 818 | 822 | 810 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Thr | ACU | 641 | 666 | 661 | 707 | 673 | 644 | 1.12 | 1.18 | 1.11 | 1.19 | 1.14 | 1.14 |
|  | ACC | 591 | 565 | 643 | 581 | 601 | 568 | 1.03 | 1.00 | 1.08 | 0.98 | 1.01 | 1.00 |
|  | ACA | 677 | 672 | 673 | 701 | 706 | 675 | 1.18 | 1.19 | 1.13 | 1.18 | 1.19 | 1.19 |
|  | ACG | 379 | 362 | 395 | 383 | 390 | 374 | 0.66 | 0.64 | 0.67 | 0.65 | 0.66 | 0.66 |
| Asn | AAU | 1681 | 1633 | 1734 | 1706 | 1713 | 1696 | 1.34 | 1.35 | 1.38 | 1.36 | 1.35 | 1.37 |
|  | AAC | 830 | 784 | 771 | 794 | 819 | 787 | 0.66 | 0.65 | 0.62 | 0.64 | 0.65 | 0.63 |
| Asp | GAU | 953 | 1126 | 1125 | 1102 | 1054 | 1023 | 1.37 | 1.40 | 1.45 | 1.43 | 1.40 | 1.41 |
|  | GAC | 443 | 477 | 430 | 438 | 450 | 430 | 0.63 | 0.60 | 0.55 | 0.57 | 0.60 | 0.59 |
| Lys | AAA | 2165 | 2060 | 2066 | 2088 | 2146 | 2115 | 1.36 | 1.35 | 1.32 | 1.33 | 1.38 | 1.35 |
|  | AAG | 1028 | 1002 | 1066 | 1044 | 967 | 1007 | 0.64 | 0.65 | 0.68 | 0.67 | 0.62 | 0.65 |
| Val | GUU | 756 | 788 | 779 | 797 | 821 | 795 | 1.32 | 1.36 | 1.35 | 1.38 | 1.40 | 1.33 |
|  | GUC | 440 | 456 | 447 | 419 | 457 | 464 | 0.77 | 0.79 | 0.78 | 0.73 | 0.78 | 0.77 |
|  | GUA | 667 | 688 | 676 | 683 | 691 | 698 | 1.16 | 1.19 | 1.17 | 1.18 | 1.18 | 1.17 |
|  | GUG | 429 | 387 | 400 | 409 | 380 | 439 | 0.75 | 0.67 | 0.70 | 0.71 | 0.65 | 0.73 |
| Ala | GCU | 452 | 522 | 473 | 541 | 510 | 517 | 1.15 | 1.26 | 1.30 | 1.29 | 1.29 | 1.31 |
|  | GCC | 413 | 417 | 381 | 390 | 388 | 366 | 1.05 | 1.01 | 1.05 | 0.93 | 0.98 | 0.92 |
|  | GCA | 460 | 456 | 359 | 467 | 433 | 463 | 1.17 | 1.10 | 0.99 | 1.12 | 1.09 | 1.17 |
|  | GCG | 241 | 264 | 241 | 276 | 254 | 237 | 0.62 | 0.64 | 0.66 | 0.66 | 0.64 | 0.60 |
| Gly | GGU | 598 | 607 | 568 | 585 | 566 | 567 | 1.03 | 1.04 | 0.97 | 1.01 | 0.98 | 0.99 |
|  | GGC | 361 | 386 | 380 | 367 | 385 | 345 | 0.62 | 0.66 | 0.65 | 0.64 | 0.67 | 0.60 |
|  | GGA | 787 | 809 | 811 | 798 | 803 | 835 | 1.36 | 1.38 | 1.39 | 1.38 | 1.39 | 1.45 |
|  | GGG | 568 | 537 | 577 | 557 | 561 | 549 | 0.98 | 0.92 | 0.99 | 0.98 | 0.97 | 0.96 |
| Pro | CCU | 644 | 683 | 672 | 698 | 687 | 693 | 1.04 | 1.09 | 1.07 | 1.09 | 1.08 | 1.10 |
|  | CCC | 657 | 677 | 661 | 641 | 665 | 638 | 1.06 | 1.08 | 1.06 | 1.00 | 1.04 | 1.01 |
|  | CCA | 745 | 736 | 745 | 777 | 767 | 755 | 1.20 | 1.18 | 1.19 | 1.21 | 1.20 | 1.19 |
|  | CCG | 428 | 405 | 423 | 451 | 434 | 443 | 0.69 | 0.65 | 0.68 | 0.70 | 0.68 | 0.70 |
| Glu | GAA | 1284 | 1352 | 1364 | 1375 | 1403 | 1326 | 1.38 | 1.35 | 1.38 | 1.38 | 1.41 | 1.37 |
|  | GAG | 574 | 656 | 612 | 616 | 581 | 605 | 0.62 | 0.65 | 0.62 | 0.62 | 0.59 | 0.63 |