

**Table S1.** Pairwise post-hoc tests of size differences between *Apodemus* OTUs for mandible (Ma), cranium (Cr), and upper molars (Mo). R square (*Rsq*) and corresponding *P* values are given above and below the diagonal, respectively. Marked differences are significant ( $P < 0.001$  after Bonferroni correction).

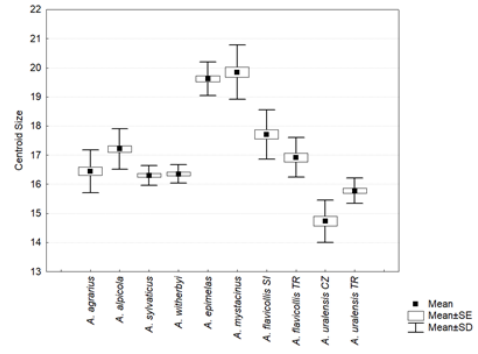
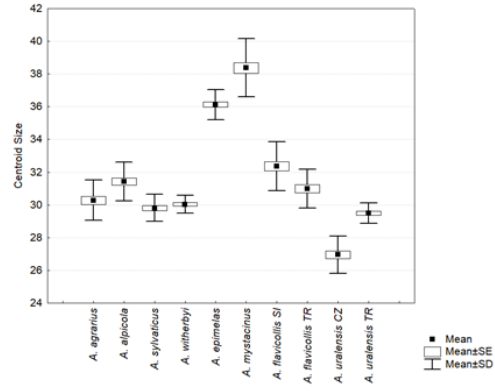
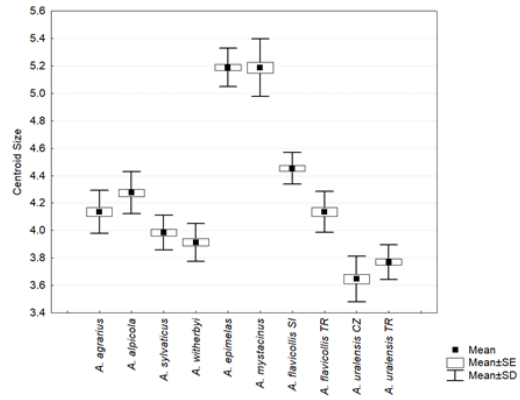
|                          |    | <i>agrarius</i> | <i>alpicola</i> | <i>sylvaticus</i> | <i>witherbyi</i> | <i>epimelas</i> | <i>mystacinus</i> | <i>flavicollis</i><br>SI | <i>flavicollis</i><br>TR | <i>uralensis</i><br>CZ | <i>uralensis</i><br>TR | mean<br><i>Rsq</i> |              |
|--------------------------|----|-----------------|-----------------|-------------------|------------------|-----------------|-------------------|--------------------------|--------------------------|------------------------|------------------------|--------------------|--------------|
| <i>agrarius</i>          | Ma | –               | <b>22.6%</b>    | 1.5%              | 0.6%             | <b>85.7%</b>    | <b>80.6%</b>      | <b>39.7%</b>             | 10.4%                    | <b>57.9%</b>           | <b>23.9%</b>           | Ma                 | <b>35.9%</b> |
|                          | Cr | –               | <b>19.2%</b>    | 5.0%              | 1.7%             | <b>88.6%</b>    | <b>87.7%</b>      | <b>36.8%</b>             | 8.2%                     | <b>67.5%</b>           | 15.2%                  | Cr                 | <b>36.7%</b> |
|                          | Mo | –               | <b>17.1%</b>    | <b>22.5%</b>      | <b>37.1%</b>     | <b>92.9%</b>    | <b>89.3%</b>      | <b>58.6%</b>             | 0.0%                     | <b>70.4%</b>           | <b>63.2%</b>           | Mo                 | <b>50.1%</b> |
| <i>alpicola</i>          | Ma | 0.0002          | –               | <b>37.6%</b>      | <b>36.3%</b>     | <b>78.0%</b>    | <b>73.0%</b>      | 10.0%                    | 4.0%                     | <b>74.1%</b>           | <b>58.8%</b>           | Ma                 | <b>43.8%</b> |
|                          | Cr | 0.0006          | –               | <b>38.9%</b>      | <b>36.1%</b>     | <b>83.8%</b>    | <b>84.8%</b>      | 10.8%                    | 3.4%                     | <b>79.4%</b>           | <b>52.0%</b>           | Cr                 | <b>45.4%</b> |
|                          | Mo | 0.0007          | –               | <b>51.2%</b>      | <b>61.1%</b>     | <b>91.0%</b>    | <b>86.7%</b>      | <b>30.5%</b>             | 17.4%                    | <b>79.8%</b>           | <b>76.8%</b>           | Mo                 | <b>56.8%</b> |
| <i>sylvaticus</i>        | Ma | 0.3964          | <0.0001         | –                 | 0.6%             | <b>92.4%</b>    | <b>85.6%</b>      | <b>53.4%</b>             | <b>26.9%</b>             | <b>68.7%</b>           | <b>32.6%</b>           | Ma                 | <b>44.4%</b> |
|                          | Cr | 0.1216          | <0.0001         | –                 | 2.6%             | <b>93.0%</b>    | <b>90.5%</b>      | <b>52.3%</b>             | <b>26.6%</b>             | <b>69.0%</b>           | 5.1%                   | Cr                 | <b>42.6%</b> |
|                          | Mo | 0.0009          | <0.0001         | –                 | 7.0%             | <b>95.3%</b>    | <b>92.5%</b>      | <b>79.7%</b>             | 23.7%                    | <b>57.8%</b>           | <b>42.4%</b>           | Mo                 | <b>52.5%</b> |
| <i>witherbyi</i>         | Ma | 0.5661          | <0.0001         | 0.6041            | –                | <b>92.6%</b>    | <b>85.9%</b>      | <b>52.9%</b>             | <b>24.7%</b>             | <b>70.9%</b>           | <b>37.9%</b>           | Ma                 | <b>44.7%</b> |
|                          | Cr | 0.3548          | <0.0001         | 0.2470            | –                | <b>94.1%</b>    | <b>91.0%</b>      | <b>51.0%</b>             | <b>23.2%</b>             | <b>76.6%</b>           | <b>18.5%</b>           | Cr                 | <b>43.9%</b> |
|                          | Mo | <0.0001         | <0.0001         | 0.0559            | –                | <b>95.6%</b>    | <b>93.1%</b>      | <b>82.6%</b>             | <b>38.2%</b>             | <b>44.6%</b>           | <b>23.4%</b>           | Mo                 | <b>53.6%</b> |
| <i>epimelas</i>          | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | –               | 2.1%              | <b>64.2%</b>             | <b>82.8%</b>             | <b>93.6%</b>           | <b>93.5%</b>           | Ma                 | <b>76.1%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | <0.0001          | –               | <b>40.6%</b>      | <b>70.8%</b>             | <b>86.1%</b>             | <b>95.5%</b>           | <b>94.8%</b>           | Cr                 | <b>83.0%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | –               | 0.0%              | <b>89.5%</b>             | <b>93.0%</b>             | <b>96.3%</b>           | <b>96.7%</b>           | Mo                 | <b>83.4%</b> |
| <i>mystacinus</i>        | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | 0.2725          | –                 | <b>59.7%</b>             | <b>75.1%</b>             | <b>89.5%</b>           | <b>88.3%</b>           | Ma                 | <b>71.1%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | –                 | <b>77.7%</b>             | <b>84.9%</b>             | <b>93.6%</b>           | <b>92.1%</b>           | Cr                 | <b>82.5%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | 0.9635          | –                 | <b>83.5%</b>             | <b>89.3%</b>             | <b>94.5%</b>           | <b>94.7%</b>           | Mo                 | <b>80.4%</b> |
| <i>flavicollis</i><br>SI | Ma | <0.0001         | 0.0108          | <0.0001           | <0.0001          | <0.0001         | <0.0001           | –                        | <b>20.5%</b>             | <b>77.3%</b>           | <b>67.3%</b>           | Ma                 | <b>49.4%</b> |
|                          | Cr | <0.0001         | 0.0090          | <0.0001           | <0.0001          | <0.0001         | <0.0001           | –                        | 19.6%                    | <b>80.5%</b>           | <b>61.5%</b>           | Cr                 | <b>51.2%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | –                        | <b>60.2%</b>             | <b>89.5%</b>           | <b>89.2%</b>           | Mo                 | <b>73.7%</b> |
| <i>flavicollis</i><br>TR | Ma | 0.0249          | 0.1424          | 0.0001            | 0.0001           | <0.0001         | <0.0001           | 0.0008                   | –                        | <b>72.1%</b>           | <b>52.8%</b>           | Ma                 | <b>41.0%</b> |
|                          | Cr | 0.0570          | 0.1944          | 0.0003            | 0.0008           | <0.0001         | <0.0001           | 0.0013                   | –                        | <b>76.2%</b>           | <b>41.8%</b>           | Cr                 | <b>41.1%</b> |
|                          | Mo | 0.9954          | 0.0016          | 0.0005            | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | –                        | <b>71.2%</b>           | <b>64.3%</b>           | Mo                 | <b>50.8%</b> |
| <i>uralensis</i><br>CZ   | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | –                      | <b>45.7%</b>           | Ma                 | <b>72.2%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | –                      | <b>67.9%</b>           | Cr                 | <b>78.5%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | –                      | 15.6%                  | Mo                 | <b>68.9%</b> |
| <i>uralensis</i><br>TR   | Ma | <0.0001         | <0.0001         | 0.0001            | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | <0.0001                | –                      | Ma                 | <b>55.6%</b> |
|                          | Cr | 0.0030          | <0.0001         | 0.0970            | 0.0008           | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | <0.0001                | –                      | Cr                 | <b>49.9%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | 0.0016                 | –                      | Mo                 | <b>62.9%</b> |

**Table S2.** Pairwise post-hoc tests of shape differences between *Apodemus* OTUs for mandible (Ma), cranium (Cr), and upper molars (Mo). R square (*Rsq*) and corresponding *P* values are given above and below the diagonal, respectively. Marked differences are significant ( $P < 0.001$  after Bonferroni correction).

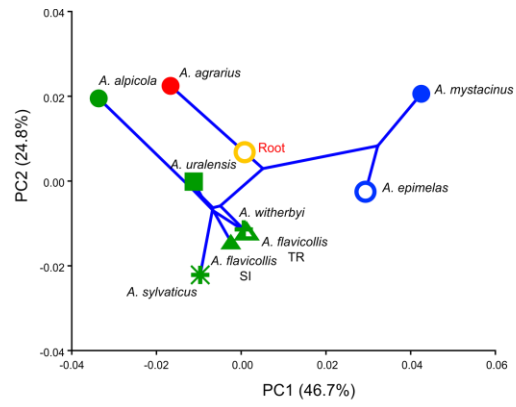
|                          |    | <i>agrarius</i> | <i>alpicola</i> | <i>sylvaticus</i> | <i>witherbyi</i> | <i>epimelas</i> | <i>mystacinus</i> | <i>flavicollis</i><br>SI | <i>flavicollis</i><br>TR | <i>uralensis</i><br>CZ | <i>uralensis</i><br>TR | mean <i>Rsq</i> |              |
|--------------------------|----|-----------------|-----------------|-------------------|------------------|-----------------|-------------------|--------------------------|--------------------------|------------------------|------------------------|-----------------|--------------|
| <i>agrarius</i>          | Ma | –               | <b>19.2%</b>    | <b>31.1%</b>      | <b>25.9%</b>     | <b>38.4%</b>    | <b>40.9%</b>      | <b>23.6%</b>             | <b>22.5%</b>             | <b>25.7%</b>           | <b>25.2%</b>           | Ma              | <b>28.1%</b> |
|                          | Cr | –               | <b>41.0%</b>    | <b>30.2%</b>      | <b>20.0%</b>     | <b>42.1%</b>    | <b>46.9%</b>      | <b>17.6%</b>             | <b>23.6%</b>             | <b>13.3%</b>           | <b>18.7%</b>           | Cr              | <b>28.2%</b> |
|                          | Mo | –               | <b>36.6%</b>    | <b>30.6%</b>      | <b>25.2%</b>     | <b>33.1%</b>    | <b>23.6%</b>      | <b>29.4%</b>             | <b>31.7%</b>             | <b>31.6%</b>           | <b>36.7%</b>           | Mo              | <b>30.9%</b> |
| <i>alpicola</i>          | Ma | <0.0001         | –               | <b>30.5%</b>      | <b>32.4%</b>     | <b>48.9%</b>    | <b>50.6%</b>      | <b>29.4%</b>             | <b>30.5%</b>             | <b>20.1%</b>           | <b>25.8%</b>           | Ma              | <b>31.9%</b> |
|                          | Cr | <0.0001         | –               | <b>41.4%</b>      | <b>38.4%</b>     | <b>46.1%</b>    | <b>37.2%</b>      | <b>33.1%</b>             | <b>42.3%</b>             | <b>31.3%</b>           | <b>33.2%</b>           | Cr              | <b>38.2%</b> |
|                          | Mo | <0.0001         | –               | <b>14.5%</b>      | <b>10.8%</b>     | <b>28.6%</b>    | <b>24.9%</b>      | <b>17.1%</b>             | <b>10.6%</b>             | <b>12.9%</b>           | <b>6.2%</b>            | Mo              | <b>18.0%</b> |
| <i>sylvaticus</i>        | Ma | <0.0001         | <0.0001         | –                 | <b>19.3%</b>     | <b>35.2%</b>    | <b>44.5%</b>      | <b>8.0%</b>              | <b>15.7%</b>             | <b>32.9%</b>           | <b>20.3%</b>           | Ma              | <b>26.4%</b> |
|                          | Cr | <0.0001         | <0.0001         | –                 | <b>17.1%</b>     | <b>32.0%</b>    | <b>38.1%</b>      | <b>18.5%</b>             | <b>17.1%</b>             | <b>11.4%</b>           | <b>19.1%</b>           | Cr              | <b>25.1%</b> |
|                          | Mo | <0.0001         | <0.0001         | –                 | <b>9.1%</b>      | <b>26.2%</b>    | <b>21.1%</b>      | <b>9.2%</b>              | <b>6.4%</b>              | <b>13.2%</b>           | <b>14.2%</b>           | Mo              | <b>16.1%</b> |
| <i>witherbyi</i>         | Ma | <0.0001         | <0.0001         | <0.0001           | –                | <b>22.9%</b>    | <b>37.2%</b>      | <b>9.6%</b>              | <b>8.5%</b>              | <b>22.3%</b>           | <b>6.5%</b>            | Ma              | <b>20.5%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | –                | <b>39.9%</b>    | <b>38.5%</b>      | <b>13.5%</b>             | <b>7.4%</b>              | <b>7.0%</b>            | <b>4.2%</b>            | Cr              | <b>20.7%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | –                | <b>23.9%</b>    | <b>18.5%</b>      | <b>9.8%</b>              | <b>9.7%</b>              | <b>11.2%</b>           | <b>12.3%</b>           | Mo              | <b>14.5%</b> |
| <i>epimelas</i>          | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | –               | <b>22.1%</b>      | <b>24.8%</b>             | <b>21.0%</b>             | <b>38.7%</b>           | <b>30.3%</b>           | Ma              | <b>31.4%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | <0.0001          | –               | <b>44.5%</b>      | <b>31.7%</b>             | <b>43.2%</b>             | <b>32.3%</b>           | <b>41.3%</b>           | Cr              | <b>39.2%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | –               | <b>14.7%</b>      | <b>15.9%</b>             | <b>23.0%</b>             | <b>28.6%</b>           | <b>30.2%</b>           | Mo              | <b>24.9%</b> |
| <i>mystacinus</i>        | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | –                 | <b>36.3%</b>             | <b>35.1%</b>             | <b>41.3%</b>           | <b>41.6%</b>           | Ma              | <b>38.8%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | –                 | <b>32.0%</b>             | <b>33.7%</b>             | <b>34.6%</b>           | <b>36.5%</b>           | Cr              | <b>38.0%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | –                 | <b>12.2%</b>             | <b>20.5%</b>             | <b>21.6%</b>           | <b>25.6%</b>           | Mo              | <b>20.3%</b> |
| <i>flavicollis</i><br>SI | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | –                        | <b>7.2%</b>              | <b>24.6%</b>           | <b>14.4%</b>           | Ma              | <b>19.8%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | –                        | <b>12.9%</b>             | <b>6.6%</b>            | <b>11.6%</b>           | Cr              | <b>19.7%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | –                        | <b>10.3%</b>             | <b>15.9%</b>           | <b>17.9%</b>           | Mo              | <b>15.3%</b> |
| <i>flavicollis</i><br>TR | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | 0.0002                   | –                        | <b>23.3%</b>           | <b>15.0%</b>           | Ma              | <b>19.9%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | –                        | <b>9.4%</b>            | <b>8.3%</b>            | Cr              | <b>22.1%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | –                        | <b>16.9%</b>           | <b>9.9%</b>            | Mo              | <b>15.4%</b> |
| <i>uralensis</i><br>CZ   | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | –                      | <b>19.3%</b>           | Ma              | <b>27.6%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | –                      | <b>5.7%</b>            | Cr              | <b>16.8%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | –                      | <b>13.6%</b>           | Mo              | <b>18.4%</b> |
| <i>uralensis</i><br>TR   | Ma | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | <0.0001                | –                      | Ma              | <b>22.0%</b> |
|                          | Cr | <0.0001         | <0.0001         | <0.0001           | 0.0012           | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | <0.0001                | –                      | Cr              | <b>19.8%</b> |
|                          | Mo | <0.0001         | <0.0001         | <0.0001           | <0.0001          | <0.0001         | <0.0001           | <0.0001                  | <0.0001                  | <0.0001                | –                      | Mo              | <b>18.5%</b> |



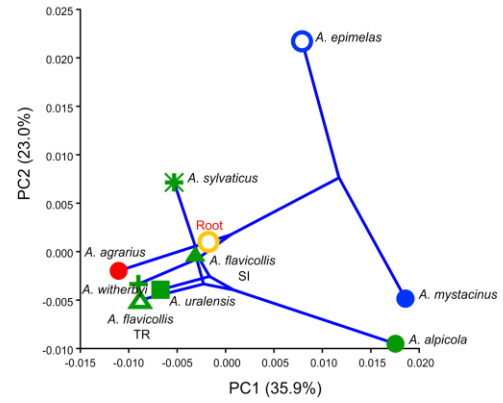


**A****B****C**

A



B



C

