

```
options pageno=1 linesize=100;
options reset=all;
title "MANOVA for Gyrinicola Thesis 4 Species";
data Gyrinicola;
  input TL EL BW NR EP Vu EPToVU MW Clade :$8.;
  datalines;
570.23 750.11 157.98 277.00 741.43 2347.48 1606.06 429.05 1
425.00 703.40 166.26 161.78 625.75 1894.82 1269.07 379.80 1
677.25 692.52 140.66 182.98 554.93 1212.01 657.08 272.39 1
801.72 734.94 136.09 217.31 464.11 1463.32 999.21 299.01 1
766.31 763.45 149.82 206.49 683.74 1363.45 679.70 263.39 1
715.23 723.14 149.04 234.78 587.84 1419.75 831.91 278.32 1
810.08 811.05 159.33 240.56 729.90 1666.42 936.52 329.01 1
744.66 777.49 161.13 222.32 726.16 1692.93 966.76 309.56 1
591.34 649.43 154.54 150.33 609.91 1489.02 879.12 333.04 1
464.77 758.33 167.93 198.43 699.90 2041.37 1341.47 364.15 1
656.13 733.17 155.53 208.26 655.58 1825.65 1170.07 373.27 1
721.48 697.18 156.58 220.50 633.87 1901.10 1267.23 318.64 1
746.91 652.23 149.54 205.41 428.19 1179.47 751.28 323.98 1
579.30 657.72 153.15 199.06 519.13 1115.99 596.86 289.28 1
522.53 666.01 124.75 168.56 629.33 1162.86 533.53 232.55 1
674.09 687.40 148.12 177.02 607.37 1144.78 537.42 295.03 1
485.42 519.60 117.53 131.99 462.94 1048.14 585.19 202.73 1
812.21 714.40 160.29 133.42 645.54 1517.85 872.31 350.21 1
692.72 660.22 143.82 175.54 559.49 1314.96 755.47 325.97 1
1175.76 865.84 166.96 260.51 822.77 1680.20 857.43 361.74 2
1117.76 882.31 145.94 242.09 842.64 1630.73 788.08 327.84 2
996.32 643.16 150.01 231.54 506.08 1205.43 699.35 306.67 2
956.11 794.13 150.22 220.89 547.70 1420.23 872.53 281.84 2
468.69 633.61 142.03 219.74 578.71 1316.84 738.13 349.84 2
585.69 558.71 128.08 177.18 500.60 1326.55 825.95 235.53 2
689.98 736.07 167.28 219.91 674.86 2048.90 1374.04 391.37 2
1132.00 719.40 152.17 164.82 588.39 1193.08 604.69 327.00 2
1284.00 818.81 171.55 228.38 604.77 1178.63 573.86 358.07 2
1028.00 610.00 121.78 139.44 672.35 1151.74 479.39 314.17 2
1081.00 737.07 166.88 190.48 574.93 1070.03 495.11 411.66 2
947.00 646.46 146.22 182.44 549.83 1376.24 826.41 384.85 2
560.70 587.15 128.16 168.34 510.37 987.61 477.24 235.08 2
475.53 553.81 161.67 162.34 485.92 1323.76 837.84 432.52 2
709.17 803.99 160.15 193.98 716.29 1270.78 554.49 318.70 2
508.28 644.52 125.73 176.20 538.07 990.48 452.41 199.05 2
662.96 743.86 162.27 180.60 700.57 1361.05 660.48 365.27 2
455.50 675.27 170.78 190.39 514.40 1845.61 1331.21 439.61 2
829.81 697.23 139.74 144.75 524.10 1233.93 709.84 319.20 2
950.50 727.80 154.01 198.21 656.89 1080.65 423.76 334.41 2
633.84 530.84 117.25 129.95 484.90 1256.76 771.86 225.81 3
549.69 608.77 142.94 160.01 621.31 1333.21 711.90 309.94 3
596.98 703.35 144.51 155.81 576.53 1525.00 948.48 305.08 3
452.53 490.24 108.52 146.10 451.35 1272.58 821.24 241.50 3
538.16 633.53 142.12 159.31 555.36 1426.72 871.36 314.29 4
```

```
787.23 638.47 186.33 187.80 592.77 1432.03 839.26 560.70 3
385.26 497.97 111.50 108.68 485.11 1093.19 608.08 165.47 3
717.93 772.26 172.01 199.97 636.71 1889.44 1252.73 423.62 3
530.95 595.63 132.77 168.22 554.02 1410.57 856.55 223.55 3
447.19 496.47 111.58 146.19 446.72 1365.53 918.81 262.24 3
686.06 709.00 188.46 188.24 620.17 2061.36 1441.19 433.70 3
787.88 861.58 194.79 175.32 720.62 2731.18 2010.56 649.69 3
671.22 763.97 172.37 190.16 713.85 2300.95 1587.10 459.53 3
677.67 727.87 177.32 189.18 611.74 2355.13 1743.39 503.35 3
442.91 760.03 142.32 195.68 744.12 1975.15 1231.04 344.89 3
688.95 572.41 135.76 134.26 760.31 1824.98 1064.67 371.26 3
678.39 494.96 110.70 144.82 649.41 1264.73 615.32 272.57 3
516.44 596.77 134.92 166.09 1048.71 1955.40 1048.71 330.12 3
783.58 581.46 142.82 142.64 866.73 1686.58 819.85 297.55 3
651.47 644.27 123.12 163.81 757.03 1338.18 581.15 258.44 3
673.43 411.22 132.91 147.12 467.65 1609.52 1141.87 253.32 3
713.23 572.54 155.86 166.55 489.75 1241.62 751.86 378.96 3
441.40 579.40 127.22 155.04 554.44 1255.51 701.07 230.12 3
657.44 558.41 148.44 144.89 504.73 1702.27 1197.54 298.98 3
632.74 595.69 120.66 163.27 566.85 1574.98 1008.13 409.40 3
371.94 572.15 123.71 156.48 498.06 1470.29 972.23 233.55 3
518.87 508.17 110.99 140.24 469.72 1265.43 795.71 267.19 3
457.62 518.77 141.90 139.45 630.01 1103.48 473.47 257.69 4
554.38 564.47 141.97 144.99 621.94 1225.63 603.70 280.62 4
333.08 544.91 128.81 153.48 566.57 1034.20 467.63 234.60 4
486.52 519.65 128.32 149.78 564.27 930.83 366.55 245.41 4
662.08 512.95 128.18 140.24 582.49 1177.70 595.20 279.63 4
319.15 364.92 90.36 92.53 274.48 455.01 180.53 144.58 4
710.14 476.97 124.19 147.20 456.33 714.72 258.39 229.12 4
318.62 453.39 100.40 137.58 416.56 703.05 286.48 172.39 4
578.67 450.67 125.60 125.27 424.03 700.71 276.69 207.09 4
687.17 556.92 117.47 146.89 426.42 777.21 350.79 229.77 4
```

```
run;
```

```
* Print data set;
```

```
proc print data=Gyrinicola;
```

```
run;
```

```
* Scatterplot matrix using a SAS macro (scatmat.sas);
```

```
%include "/home/u60760518/ForLogReg/gdispla.sas";
```

```
%include "/home/u60760518/ForLogReg/contour.sas";
```

```
%include "/home/u60760518/ForLogReg/scatmat.sas";
```

```
*goptions device=win;
```

```
%scatmat(data=Gyrinicola,var=TL EL BW NR EP Vu MW,group=Clade,anno=ellipse);
```

```
run;
```

```
* MANOVA using proc glm;
```

```
proc glm data=Gyrinicola;
```

```
class Clade;
```

```
model TL EL BW NR EP Vu MW = Clade;
```

```
manova h=Clade / printh printe;
```

```
manova h=Clade / canonical;
```

```
run;
```

```
* Canonical plots;  
%include "/home/u60760518/sasuser.v94/NewEquate.sas";  
%include "/home/u60760518/sasuser.v94/New_Canplot - Copy.sas";  
%canplot(data=Gyrinicola,class=Clade,var=TL EL BW NR EP Vu MW);  
run;  
quit;
```