

Function__GeneticGain

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30 11 2018

Functions

Covariance Matrices

Function for covariance matrix between true and estimated breeding values

Function for asymptotic covariance matrix between true and estimated breeding values

Genetic Gain selection on index

Function for genetic gain when selecting for index in Sfr./year

Function for correlated genetic gain when selecting for index in trait unit / year

Genetic gain selection on CF

Function for genetic gain when selecting for CF in Sfr./year

Function for correlated genetic gain when selecting for index in trait unit / year

Results

General Inputs

```
##          cCC      aCC      cCF      aCF      cCW      aCW
## [1,]  0.40150  0.33639 -0.00993 -0.03782  1.828    2.538
## [2,]  0.33639  0.40130 -0.00655  0.03484  1.262    3.387
## [3,] -0.00993 -0.00655  0.12067  0.09218 -0.050    0.434
## [4,] -0.03782  0.03484  0.09218  0.13028 -0.404    1.322
## [5,]  1.82800  1.26200 -0.05000 -0.40400 31.100   48.700
## [6,]  2.53800  3.38700  0.43400  1.32200 48.700  194.700

##          cCC      aCC      cCF      aCF      cCW      aCW
## [1,] 0.35845 0.00000 0.13154 0.00000  2.907    0.000
## [2,] 0.00000 0.26631 0.00000 0.00931  0.000    4.903
## [3,] 0.13154 0.00000 0.23651 0.00000  2.463    0.000
## [4,] 0.00000 0.00931 0.00000 0.19451  0.000    2.162
## [5,] 2.90700 0.00000 2.46300 0.00000 90.400    0.000
## [6,] 0.00000 4.90300 0.00000 2.16200  0.000  346.600

## [1] 20
## [1] 5
## [1] 0.1
## [1] 0.5
```

```
## [1] 0.5
## [1] 0.5
## [1] 5.7
## [1] 5.4
```

Covariance Matrices

Produce result of function for covariance matrix

```
## 12 x 6 Matrix of class "dgeMatrix"
##           cCC           aCC           cCF           aCF           cCW
## [1,]  0.28728912  0.269207152 -0.024101853 -0.027013630  1.1930273
## [2,]  0.26920715  0.292142373 -0.005946672  0.013804679  0.9508704
## [3,] -0.02410185 -0.005946672  0.070294792  0.067381575 -0.2578107
## [4,] -0.02701363  0.013804679  0.067381575  0.081882699 -0.3287462
## [5,]  1.19302727  0.950870356 -0.257810670 -0.328746211 16.4012857
## [6,]  1.84432820  2.098894545  0.206880238  0.550844212 32.6104547
## [7,]  0.17017145  0.159030205 -0.017973781 -0.018592365  0.6792986
## [8,]  0.15903021  0.162244816 -0.007682085 -0.001330154  0.5466557
## [9,] -0.01797378 -0.007682085  0.036333276  0.035026960 -0.1888854
## [10,] -0.01859237 -0.001330154  0.035026960  0.039095701 -0.2160769
## [11,]  0.67929862  0.546655746 -0.188885408 -0.216076917  8.0702786
## [12,]  0.99632454  1.006559152 -0.004818680  0.082843574 15.0470057
##           aCW
## [1,]  1.84432820
## [2,]  2.09889455
## [3,]  0.20688024
## [4,]  0.55084421
## [5,] 32.61045467
## [6,]105.97005695
## [7,]  0.99632454
## [8,]  1.00655915
## [9,] -0.00481868
## [10,]  0.08284357
## [11,] 15.04700565
## [12,] 41.90456913
```

Produce result of function for asymptotic covariance matrix

```
## 12 x 6 Matrix of class "dgeMatrix"
##           cCC           aCC           cCF           aCF           cCW
## [1,]  0.187207076  0.175503339 -0.015026731 -0.017127229  0.78244165
## [2,]  0.175503339  0.192352721 -0.003111346  0.010741070  0.62266224
## [3,] -0.015026731 -0.003111346  0.046780354  0.044805026 -0.16135631
## [4,] -0.017127229  0.010741070  0.044805026  0.055084440 -0.21030228
## [5,]  0.782441648  0.622662239 -0.161356311 -0.210302281 10.98959612
## [6,]  1.219475432  1.411164565  0.158193116  0.403643288 22.03388249
## [7,]  0.070089408  0.065326393 -0.008898659 -0.008705964  0.26871299
## [8,]  0.065326393  0.062455164 -0.004846760 -0.004393764  0.21844763
## [9,] -0.008898659 -0.004846760  0.012818838  0.012450411 -0.09243105
## [10,] -0.008705964 -0.004393764  0.012450411  0.012297442 -0.09763299
```

```
## [11,] 0.268712990 0.218447628 -0.092431049 -0.097632987 2.65858897
## [12,] 0.371471778 0.318829171 -0.053505802 -0.064357351 4.47043347
##          aCW
## [1,] 1.21947543
## [2,] 1.41116456
## [3,] 0.15819312
## [4,] 0.40364329
## [5,] 22.03388249
## [6,] 72.88438136
## [7,] 0.37147178
## [8,] 0.31882917
## [9,] -0.05350580
## [10,] -0.06435735
## [11,] 4.47043347
## [12,] 8.81889354
```

Angus

Breed specific input

```
## [1] 0.479417700 0.256684900 0.418876900 -0.069085800 -0.088156252
## [6] -0.002195078
```

Genetic gain index

```
## [1] 0.06306061
```

Correlated genetic gain index

```
##          trait
## [1,] "cCC" "0.038174065562569"
## [2,] "aCC" "0.0470001534625087"
## [3,] "cCF" "0.0140769117416899"
## [4,] "aCF" "0.0166593486210998"
## [5,] "cCW" "-0.301574147992976"
## [6,] "aCW" "-0.621316101739681"
```

Genetic gain CF

```
## [1] 0.02286001
```

Correlated genetic gain CF

```
##          trait
## [1,] "cCC" "-0.0171980241633864"
## [2,] "aCC" "0.00411070021047558"
## [3,] "cCF" "0.0385030530260203"
## [4,] "aCF" "0.0450712319002212"
## [5,] "cCW" "-0.205375432325404"
## [6,] "aCW" "0.224245768154972"
```

Limousin

Breed specific input

```
## [1] 0.386055800 0.196170100 0.576160200 0.135590000 -0.164163323
## [6] -0.002251035
```

Genetic gain index

```
## [1] 0.1037291
```

Correlated genetic gain index

```
##      trait
## [1,] "cCC" "-0.013555613729995"
## [2,] "aCC" "-0.000745472217530385"
## [3,] "cCF" "0.020982393054045"
## [4,] "aCF" "0.0240509783443276"
## [5,] "cCW" "-0.557251877309649"
## [6,] "aCW" "-1.01193935075086"
```

Genetic gain CF

```
## [1] 0.05403066
```

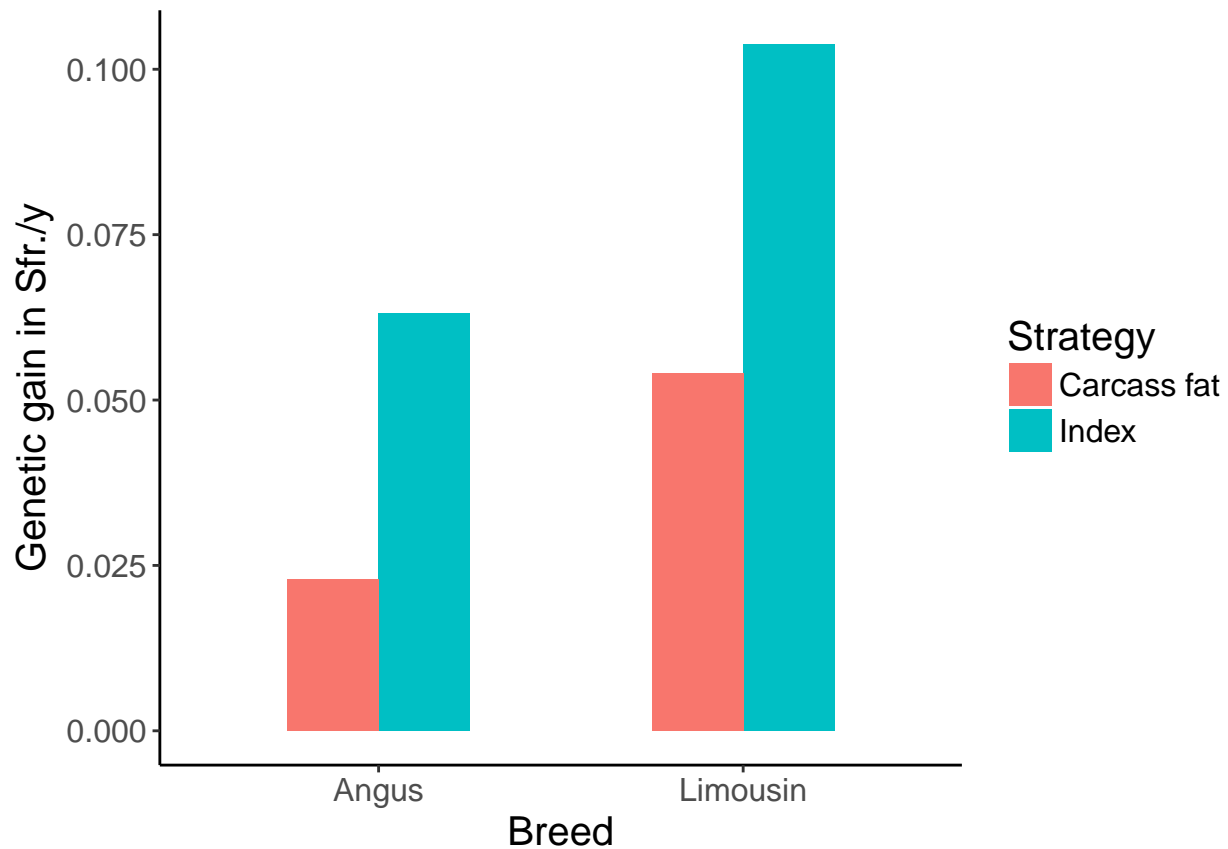
Correlated genetic gain CF

```
##      trait
## [1,] "cCC" "-0.0172781860281692"
## [2,] "aCC" "0.00300563140393629"
## [3,] "cCF" "0.0393554472365974"
## [4,] "aCF" "0.0449796408691598"
## [5,] "cCW" "-0.203183228485631"
## [6,] "aCW" "0.21069441257492"
```

Graphics

Produce barplot genetic gain Sfr.

```
##      Gain      Breed      Strategy
## 1 0.06306061      Angus      Index
## 2 0.10372906  Limousin      Index
## 3 0.02286001      Angus  Carcass fat
## 4 0.05403066  Limousin  Carcass fat
```



Produce barplot correlated genetic gains trait units.

##	trait	Gain	Breed	Strategy
## 1	cCC	0.0381740656	Angus	Index
## 2	aCC	0.0470001535	Angus	Index
## 3	cCF	0.0140769117	Angus	Index
## 4	aCF	0.0166593486	Angus	Index
## 5	cCW	-0.3015741480	Angus	Index
## 6	aCW	-0.6213161017	Angus	Index
## 7	cCC	-0.0171980242	Angus	CF
## 8	aCC	0.0041107002	Angus	CF
## 9	cCF	0.0385030530	Angus	CF
## 10	aCF	0.0450712319	Angus	CF
## 11	cCW	-0.2053754323	Angus	CF
## 12	aCW	0.2242457682	Angus	CF
## 13	cCC	-0.0135556137	Limousin	Index
## 14	aCC	-0.0007454722	Limousin	Index
## 15	cCF	0.0209823931	Limousin	Index
## 16	aCF	0.0240509783	Limousin	Index
## 17	cCW	-0.5572518773	Limousin	Index
## 18	aCW	-1.0119393508	Limousin	Index
## 19	cCC	-0.0172781860	Limousin	CF
## 20	aCC	0.0030056314	Limousin	CF
## 21	cCF	0.0393554472	Limousin	CF
## 22	aCF	0.0449796409	Limousin	CF
## 23	cCW	-0.2031832285	Limousin	CF

24 aCW 0.2106944126 Limousin CF

