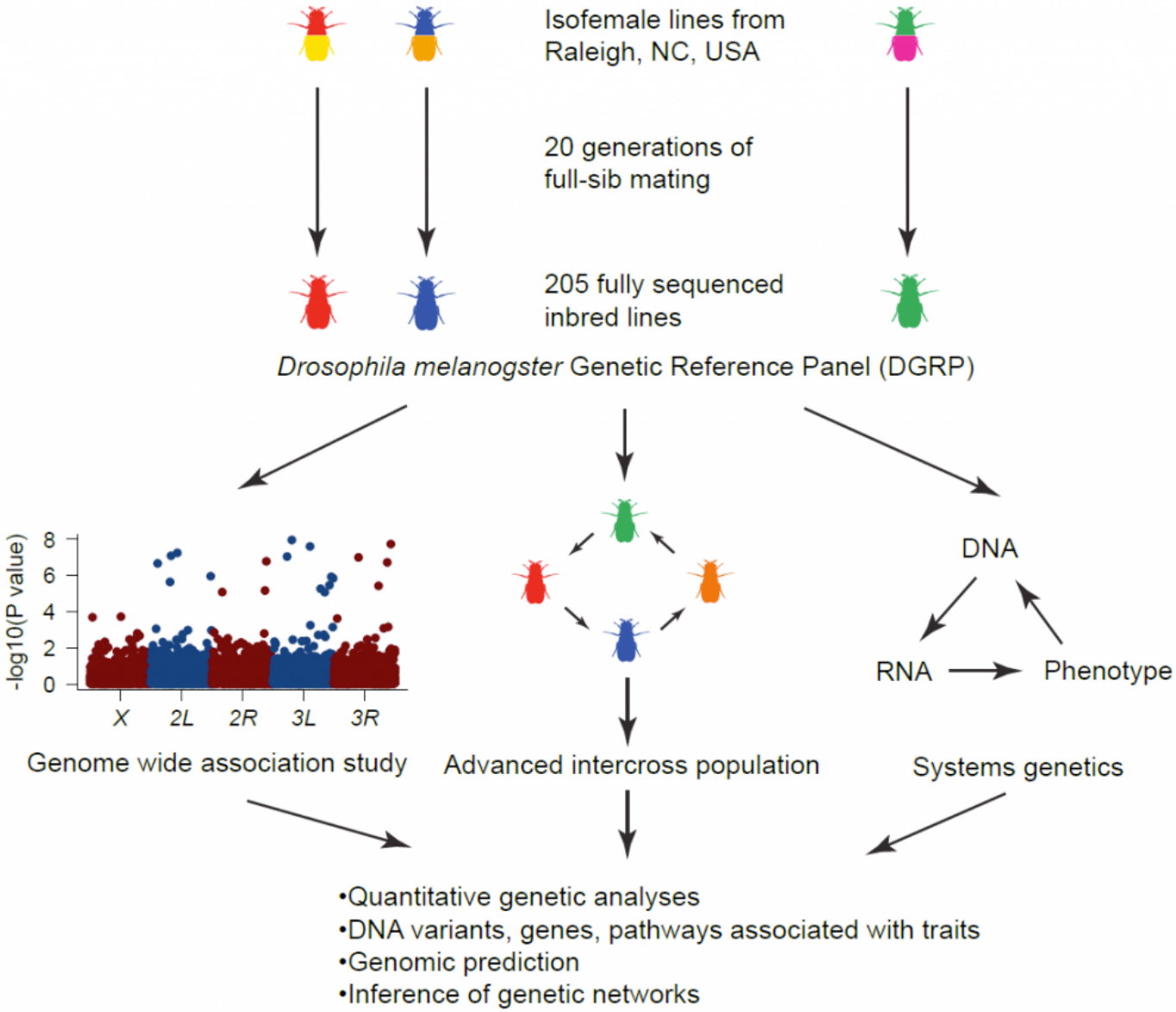
THE DROSOPHILA GENETICS REFERENCE PANNEL

DGRP

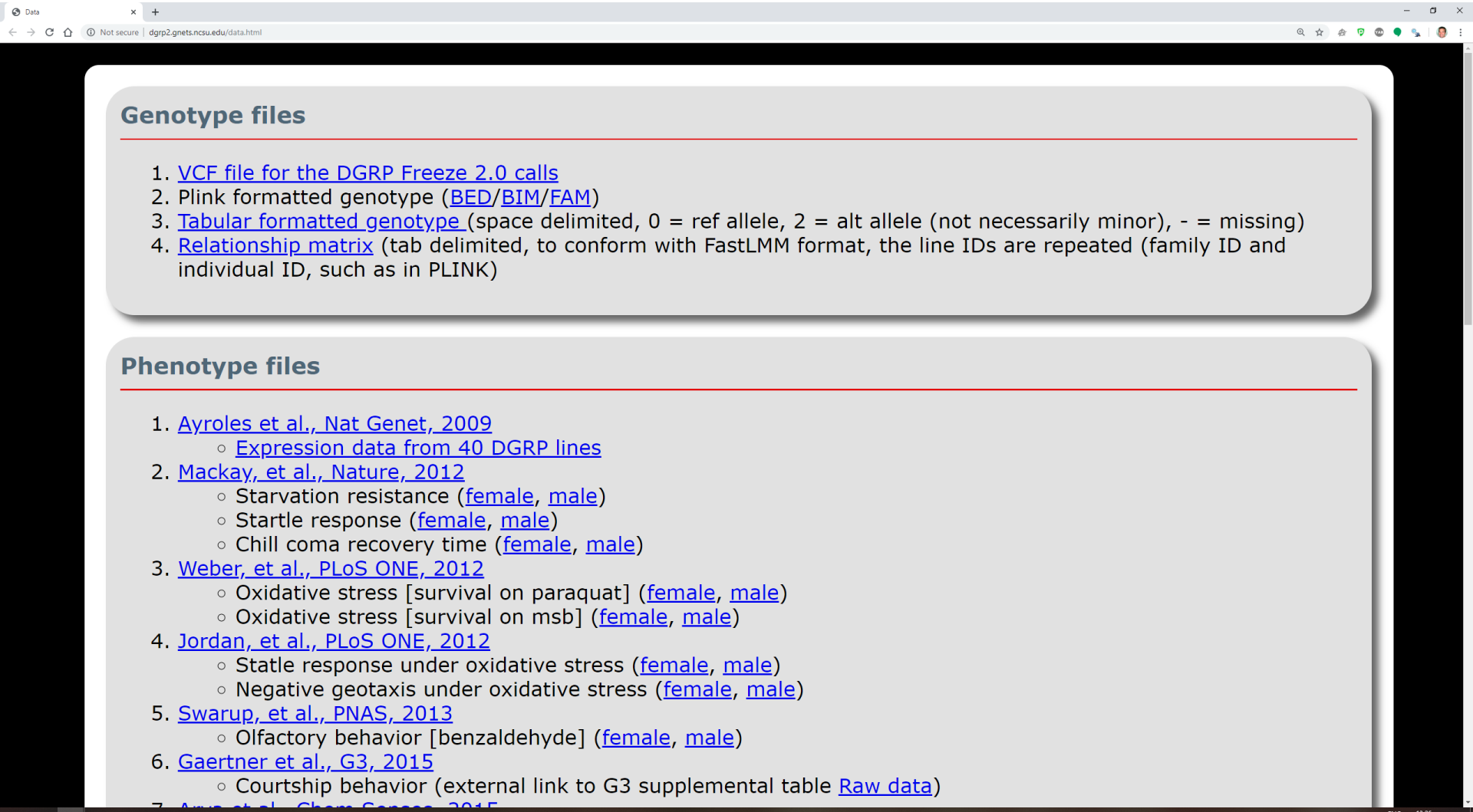
The idea in a nutshell

- Catch pregnant flies (ie isofemales) at Raleigh's Farmers market (North Carolina, USA)
- Inbreed them (in the lab)
- Sequence the homozyguous survivors of that brutal inbreeding treatment

An overview


Isofemale lines from
Raleigh, NC, USA
20 generations of
full-sib mating
205 fully sequenced
inbred lines
Drosophila melanogster Genetic Reference Panel (DGRP)
-log10(P value)
8
6
4
2
0
X
2L
2R
3L
3R
DNA
RNA
Phenotype
Genome wide association study
Advanced intercross population
Systems genetics
•Quantitative genetic analyses
•DNA variants, genes, pathways associated with traits
•Genomic prediction
•Inference of genetic networks

The data, *all the data* all available publicly at North Carolina State University, see http://dgrp2.gnets.ncsu.edu/



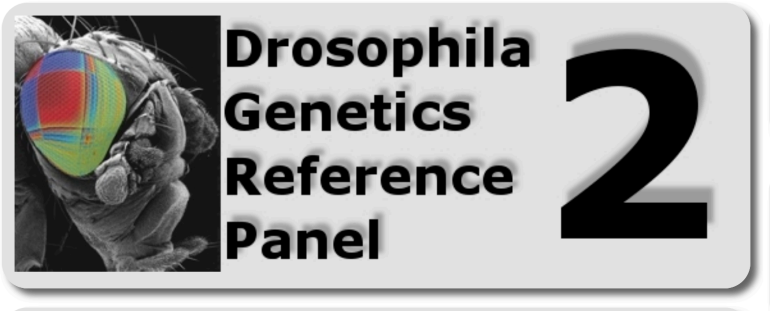
The data associated with the project

The tabular genotypes file that you have to wrangle is at http://dgrp2.gnets.ncsu.edu/data/website/dgrp2.tgeno

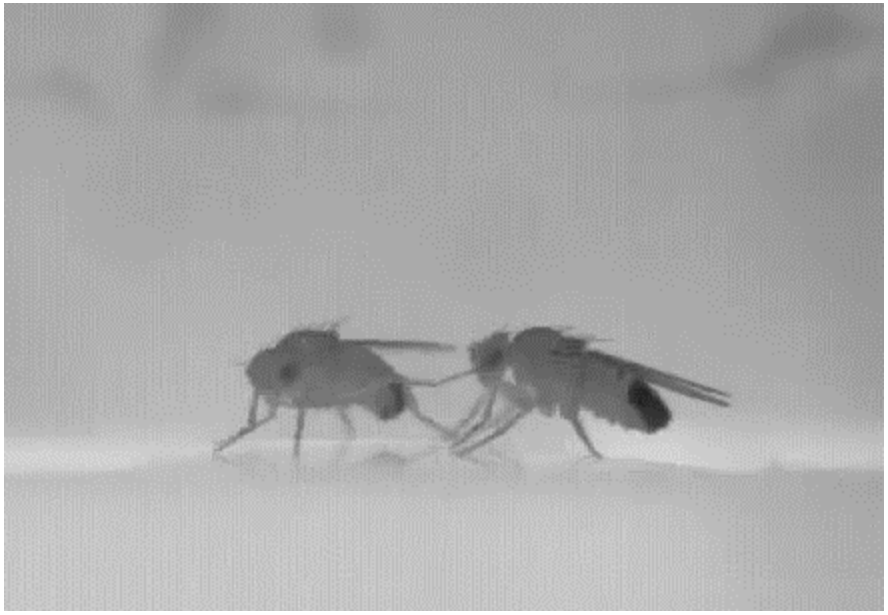
Data is complementary to what is analysed in the paper by Shorter et al 2015 on QTL for Drosophila aggression:
https://www.ncbi.nlm.nih.gov/pubmed/26100892

It's also on the webpage (see the Shorter et al., Aggressive behavior).

Both datasets are in dropbox



Aggressive males



Why it matters

The highlights are that male fruit flies use aggression for resource defence polygyny (a fancy name for “mate guarding”).

If you are Drosophila enthusiast and want to know more, see all the gory details in a study published in Animal Behaviour

Aggression, mate guarding and fitness in male fruit flies
https://doi.org/10.1016/j.anbehav.2015.08.023

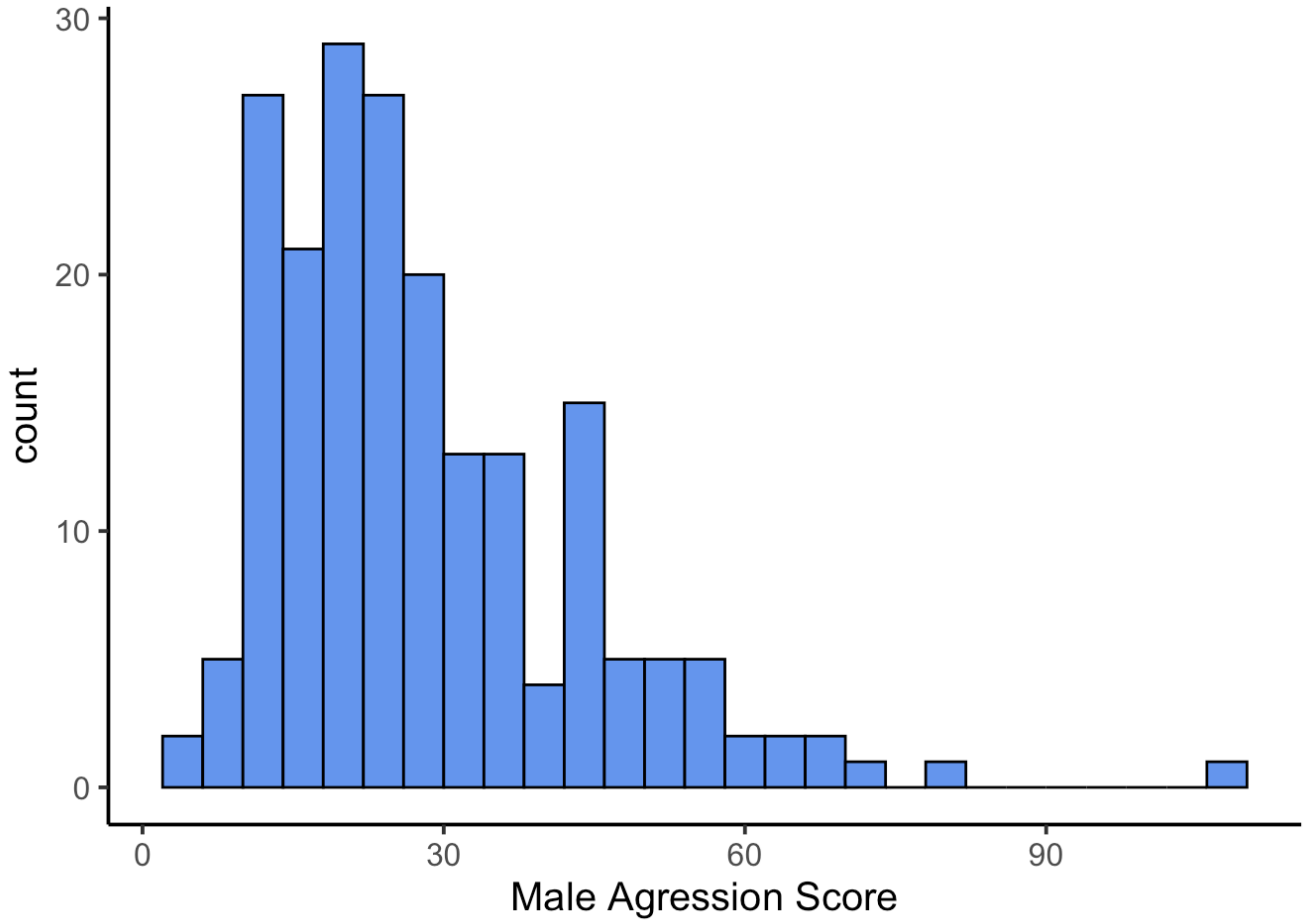
Genotype data

```
> genotypes[1:10,1:20]
# A tibble: 10 x 20
   chr     pos id    ref   alt    refc  altc  qual   cov line_21 line_26 line_28 line_31 line_32 line_38 line_40 line_41
   <chr> <dbl> <chr> <chr> <chr> <dbl> <dbl> <dbl> <dbl>   <dbl> <chr>     <dbl>   <dbl> <chr>     <dbl>   <dbl>   <dbl>
 1 2L     4998 2L_4~ G     A       117     5   999    12       0 -             0       0 -             0       0       0
 2 2L     5002 2L_5~ G     T       127     1   999    13       0 -             0       0 -             0       0       0
 3 2L     5039 2L_5~ C     T         1   118   999    21       2 -             2       2 -             2       2       2
 4 2L     5040 2L_5~ G     A         1   118   999    21       2 -             2       2 -             2       2       2
 5 2L     5092 2L_5~ C     T         6   119   999    22       2 -             2       2 -             2       2       2
 6 2L     5095 2L_5~ T     A         4   115   999    22       2 -             2       2 -             2       2       2
 7 2L     5153 2L_5~ A     C       155     2   999    14       0 0             0       0 0             0       0       0
 8 2L     5232 2L_5~ C     T       191     1   999    19       0 0             0       0 0             0       0       0
 9 2L     5233 2L_5~ G     C       189     2   999    19       0 0             0       0 0             0       0       0
10 2L     5317 2L_5~ G     A       177    11   999    17       0 0             0       2 0             0       0       0
# ... with 3 more variables: line_42 <chr>, line_45 <chr>, line_48 <chr>
>
```

Aggression data

```
> phenotypes
# A tibble: 200 x 2
   lineid   aggression_score
   <chr>                <dbl>
 1 line_100              25.2
 2 line_101              15.9
 3 line_105              19.7
 4 line_109               9.61
 5 line_129              31.7
 6 line_136              24.6
 7 line_138              26.4
 8 line_142              25.6
 9 line_149              34.6
10 line_153              13.8
# ... with 190 more rows
>
```

Distribution of aggression scores



Relating aggression scores to SNPs

A zoom on 4 SNPs