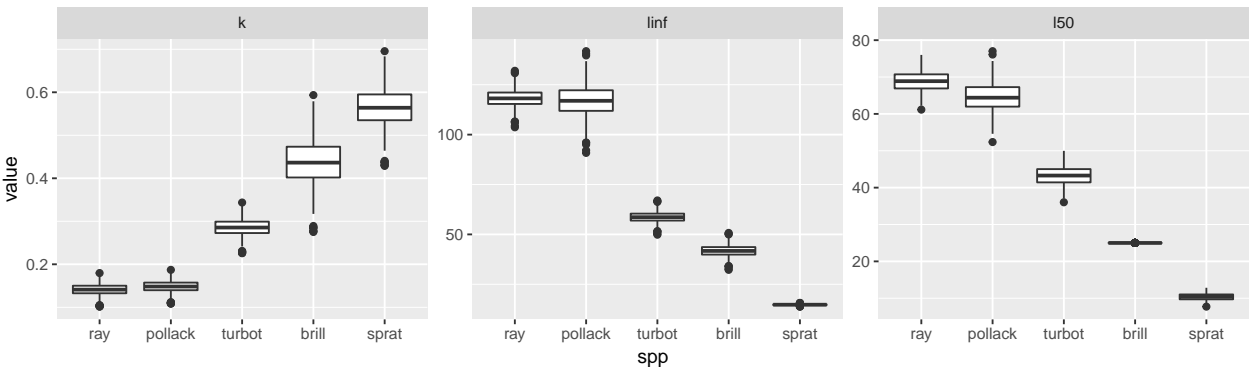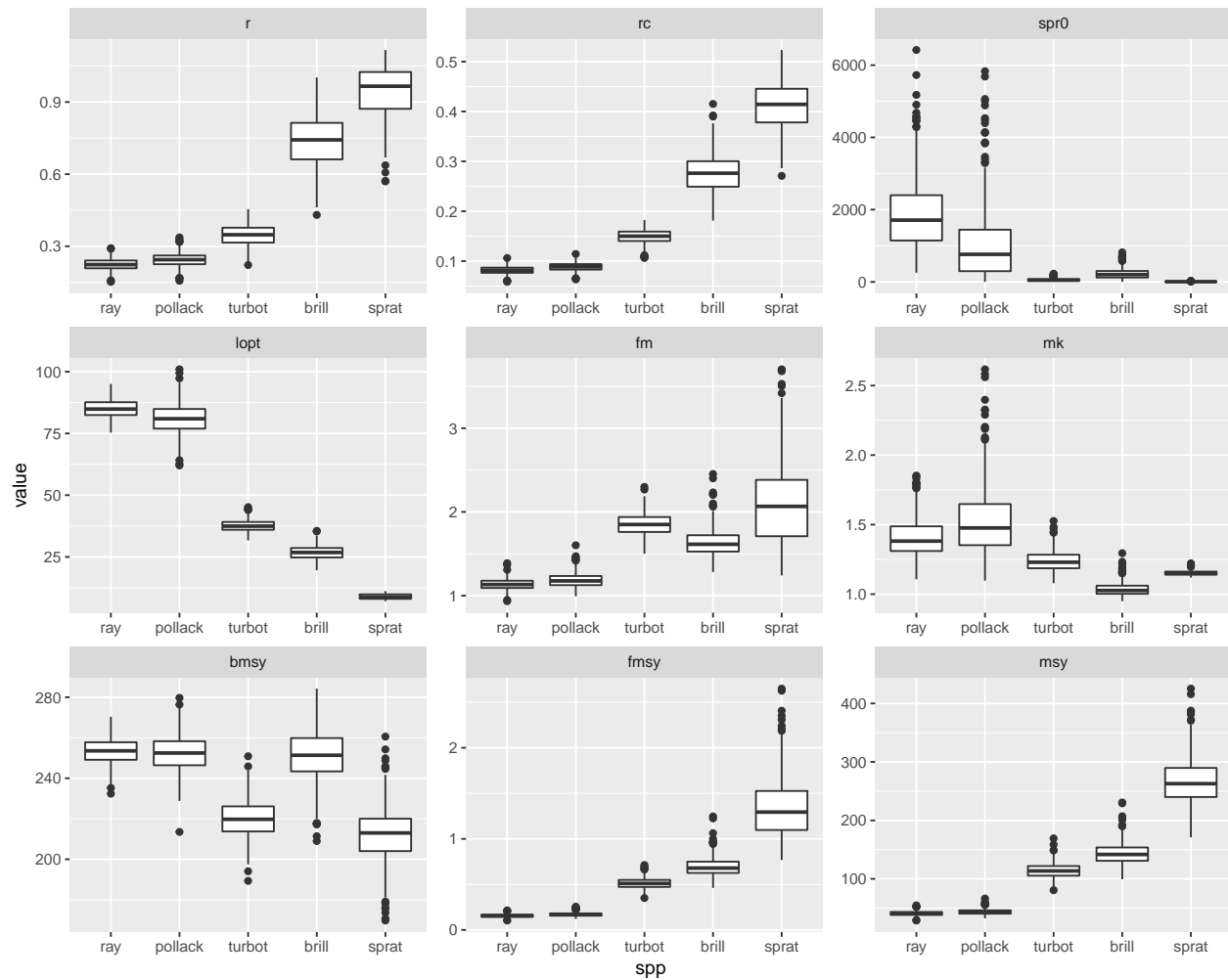# Random Grid

Figs

L Kell & A Tidd

07 November, 2018

Life history parameters

Figure 1 Life history parameters.
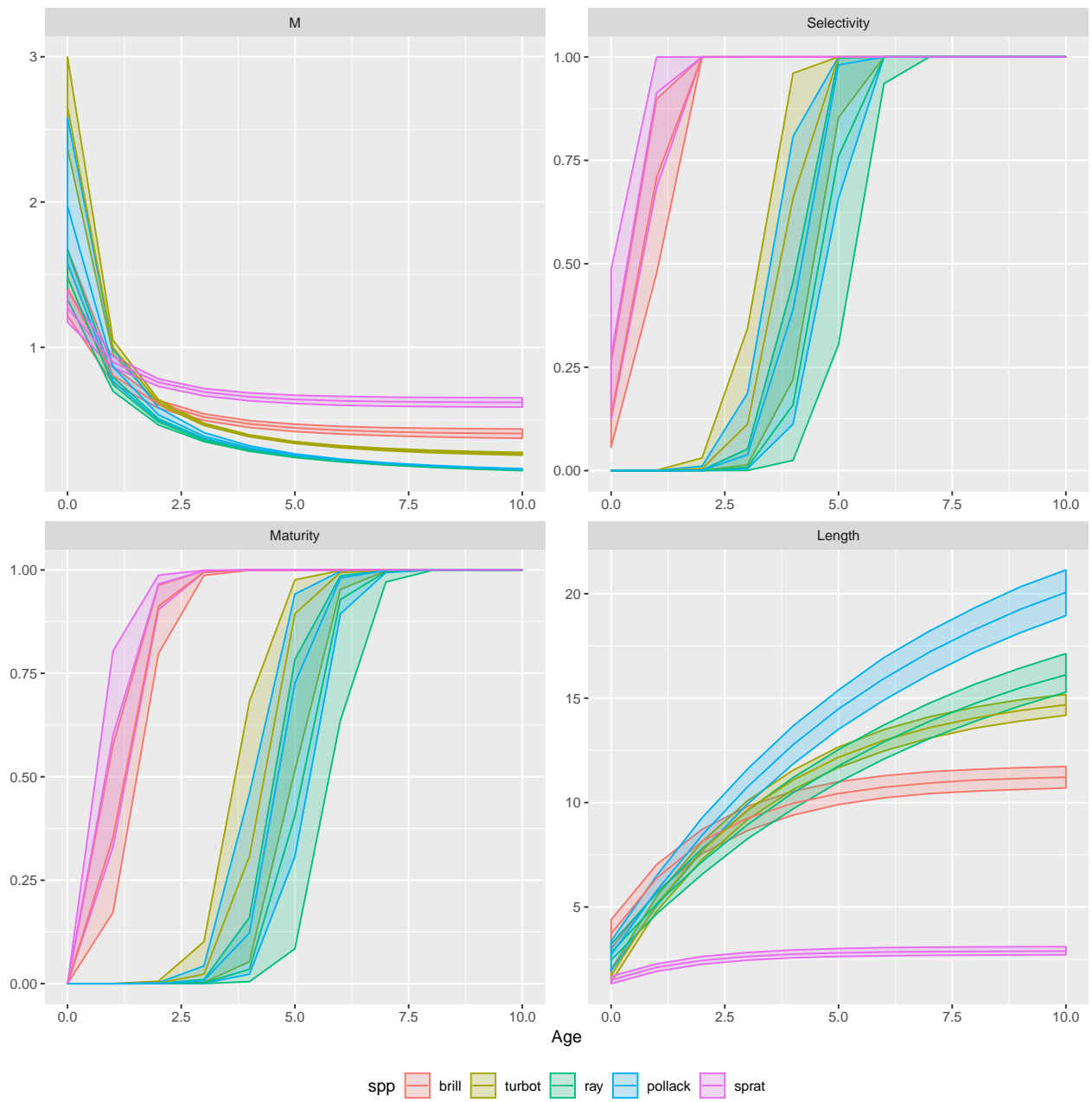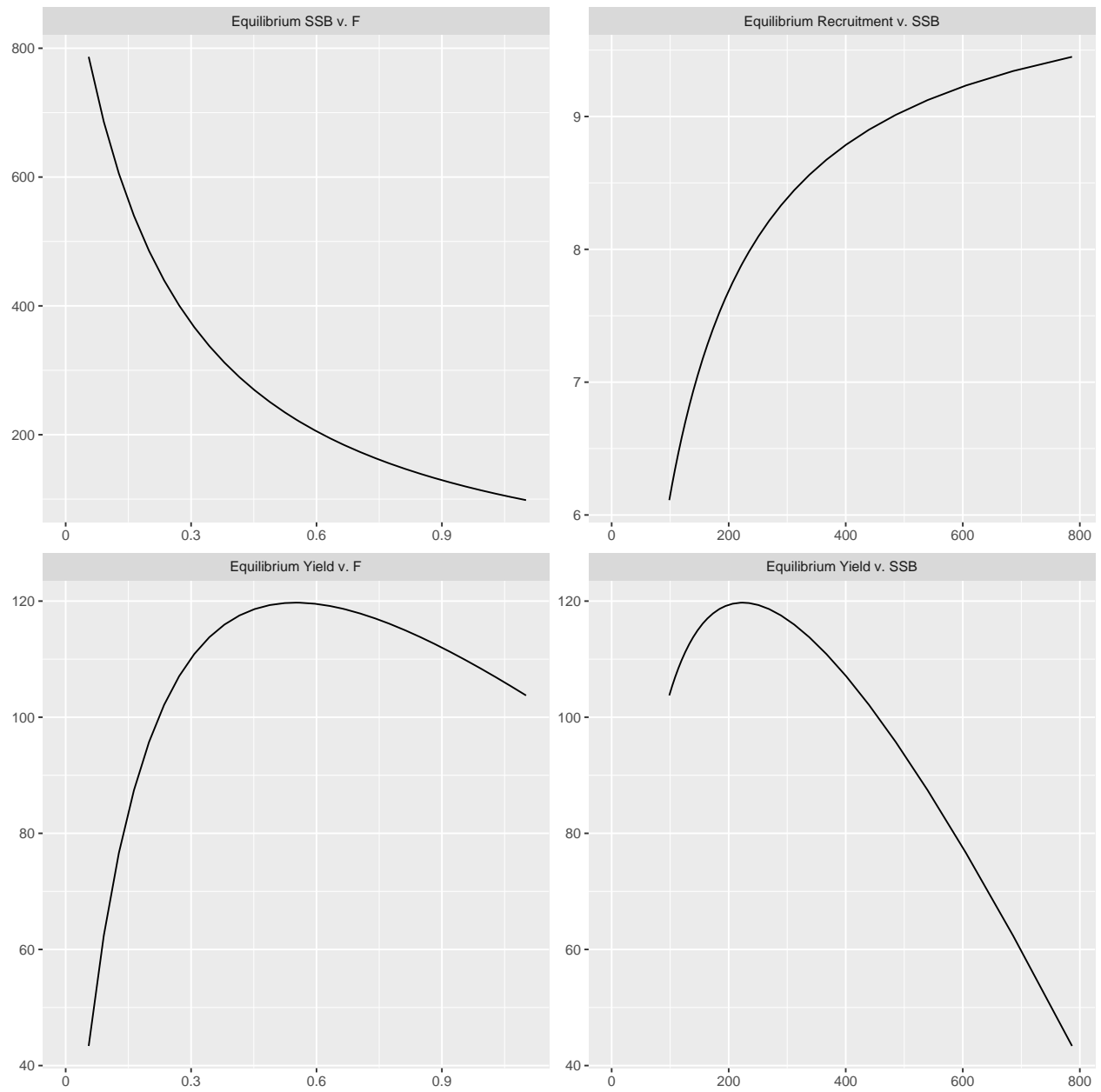
Figure 2 Reference points.

Equilibrium dynamics

The parameters are then used by `lhEql` to simulate the equilibrium dynamics by combining the spawner/yield per recruit relationships with a stock recruiment relationship.
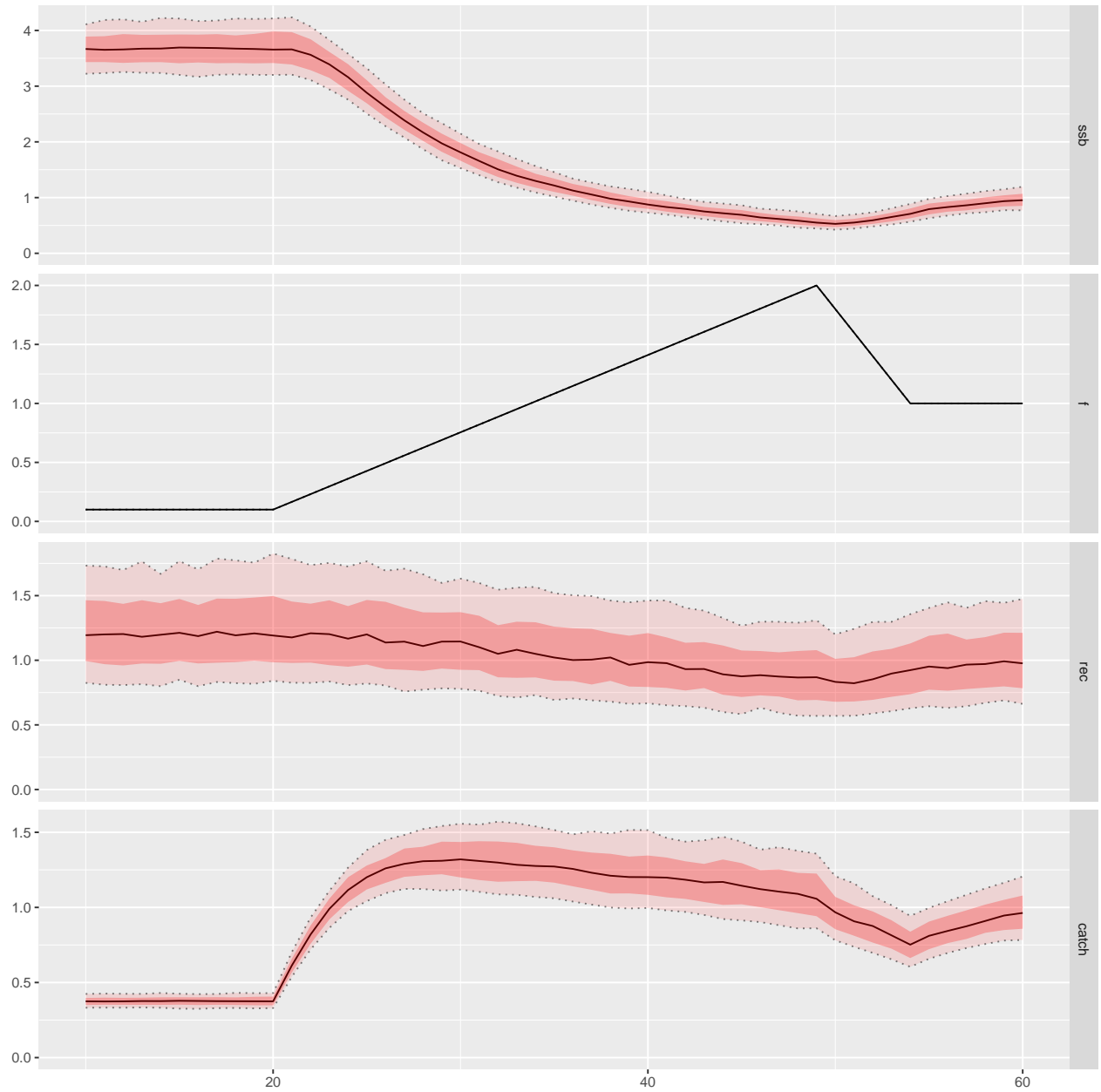
```
[1] 1
[1] "length" "params"
[1] 2
```

Figure 3 Vectors.

Figure 4 Equilibrium Curves.

Population dynamics

Figure 5 Time series relative to MSY benchmarks.

Software Versions

- R version 3.4.4 (2018-03-15)
- FLCore: 2.6.9.9009
- FLBRP: 2.5.3.9001
- FLasher: 0.5.0.9001
- FLife: 3.2.1.9001
- ggplotFL: 2.6.4.9002
- **Compiled**: Wed Nov 7 15:22:41 2018

Author information

Laurence Kell. laurie@seaplusplus.es

Acknowledgements

References

Session Info

```
R version 3.4.4 (2018-03-15)
Platform: x86_64-pc-linux-gnu (64-bit)
Running under: Ubuntu 16.04.2 LTS

Matrix products: default
BLAS: /usr/lib/libblas/libblas.so.3.6.0
LAPACK: /usr/lib/lapack/liblapack.so.3.6.0

locale:
 [1] LC_CTYPE=en_US.UTF-8       LC_NUMERIC=C
 [3] LC_TIME=en_GB.UTF-8        LC_COLLATE=en_US.UTF-8
 [5] LC_MONETARY=en_GB.UTF-8    LC_MESSAGES=en_US.UTF-8
 [7] LC_PAPER=en_GB.UTF-8       LC_NAME=C
 [9] LC_ADDRESS=C               LC_TELEPHONE=C
[11] LC_MEASUREMENT=en_GB.UTF-8 LC_IDENTIFICATION=C

attached base packages:
[1] stats     graphics  grDevices utils     datasets  methods   base

other attached packages:
 [1] FLife_3.2.1.9001     ggplotFL_2.6.4.9002 FLasher_0.5.0.9001
 [4] FLFishery_0.1.5      FLBRP_2.5.3.9001    FLCore_2.6.9.9009
 [7] lattice_0.20-35      GGally_1.4.0        reshape_0.8.7
[10] dplyr_0.7.6          plyr_1.8.4          ggplot2_3.0.0
[13] knitr_1.20

loaded via a namespace (and not attached):
 [1] Rcpp_0.12.19       pillar_1.1.0      compiler_3.4.4
 [4] RColorBrewer_1.1-2 bindr_0.1.1       tools_3.4.4
 [7] digest_0.6.15      evaluate_0.10.1   tibble_1.4.2
[10] gtable_0.2.0       pkgconfig_2.0.1   rlang_0.2.2
[13] Matrix_1.2-10      yaml_2.1.18       bindrcpp_0.2.2
[16] gridExtra_2.3      withr_2.1.2       stringr_1.3.1
[19] stats4_3.4.4       rprojroot_1.3-2   grid_3.4.4
[22] tidyselect_0.2.4   glue_1.2.0        R6_2.2.2
[25] rmarkdown_1.9      reshape2_1.4.3    purrr_0.2.5
[28] magrittr_1.5       codetools_0.2-15  backports_1.1.2
[31] scales_1.0.0       htmltools_0.3.6   MASS_7.3-51
[34] assertthat_0.2.0   colorspace_1.3-2  labeling_0.3
[37] stringi_1.2.3      lazyeval_0.2.1    munsell_0.5.0
```