FLife

WKLIFE Life History Relationships

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FLife package

```
library(ggplot2)
library(FLife)
library(plyr)
library(reshape)
```

Life history parameters

```
data(wklife)

wklife
```

```
                         name           common          area    stock sex
1             Clupea harengus          Herring   Celtic Seas  her-nis   F
2       Pollachius pollachius          Pollack     North Sea pol-nsea   C
3                  Molva molva             Ling        Widely lin-comb   C
4         Sebastes norvegicus        Rose fish      Northern  smn-con   C
5           Mullus surmuletus       Red mullet   Celtic Seas mut-comb   F
6         Scopthalmus maximus           Turbot     North Sea tur-nsea   F
7            Microstomus kitt       Lemon sole     North Sea lem-nsea   C
8  Lepidorhombus whiffiagonis           Megrim     North Sea meg-4a6a   C
9              Ammodytes spp.         Sandeels     North Sea  san-ns4   C
10      Pleuronectes platessa           Plaice   Celtic Seas ple-celt   F
11       Merlangius merlangus          Whiting   Celtic Seas whg-7e-k   F
12   Melanogrammus aeglefinus          Haddock   Celtic Seas had-iris   C
13        Lophius piscatorius White anglerfish   Celtic Seas ang-78ab   C
14        Lophius piscatorius White anglerfish     North Sea ang-ivvi   C
15                    Nephrops        Shellfish Biscay-Iberia nep-2829   F
         a    b lmax  linf  l50 a50    t0     k
1  0.00480 3.20   NA  33.0 23.0  NA    NA 0.606
2  0.00760 3.07   NA  85.6 47.1  NA    NA 0.190
3  0.00360 3.11   NA 119.0 74.0 7.2    NA 0.140
4  0.01780 2.97   NA  50.2 40.3  NA  0.08 0.110
5  0.00570 3.24   NA  47.5 16.9  NA    NA 0.210
6  0.01490 3.08   NA  66.7 34.2 2.2  0.29 0.320
7  0.01230 2.97   NA  37.0 27.0  NA    NA 0.420
8  0.00220 3.34   NA  54.0 23.0 3.0    NA 0.120
9  0.00490 2.78   NA  24.0 12.0  NA    NA 1.000
10 0.01100 2.96   NA  48.0 22.9  NA    NA 0.230
11 0.01030 2.40   NA  38.0 28.0  NA -1.01 0.380
12 0.01130 2.96   NA  79.9   NA 2.0 -0.36 0.200
```

```
13 0.01980 2.90  133 105.6 73.0  NA -0.38 0.180
14 0.02970 2.84   NA 106.0 61.0  NA    NA 0.180
15 0.00056 3.03   NA  65.0 30.0  NA    NA 0.065
```

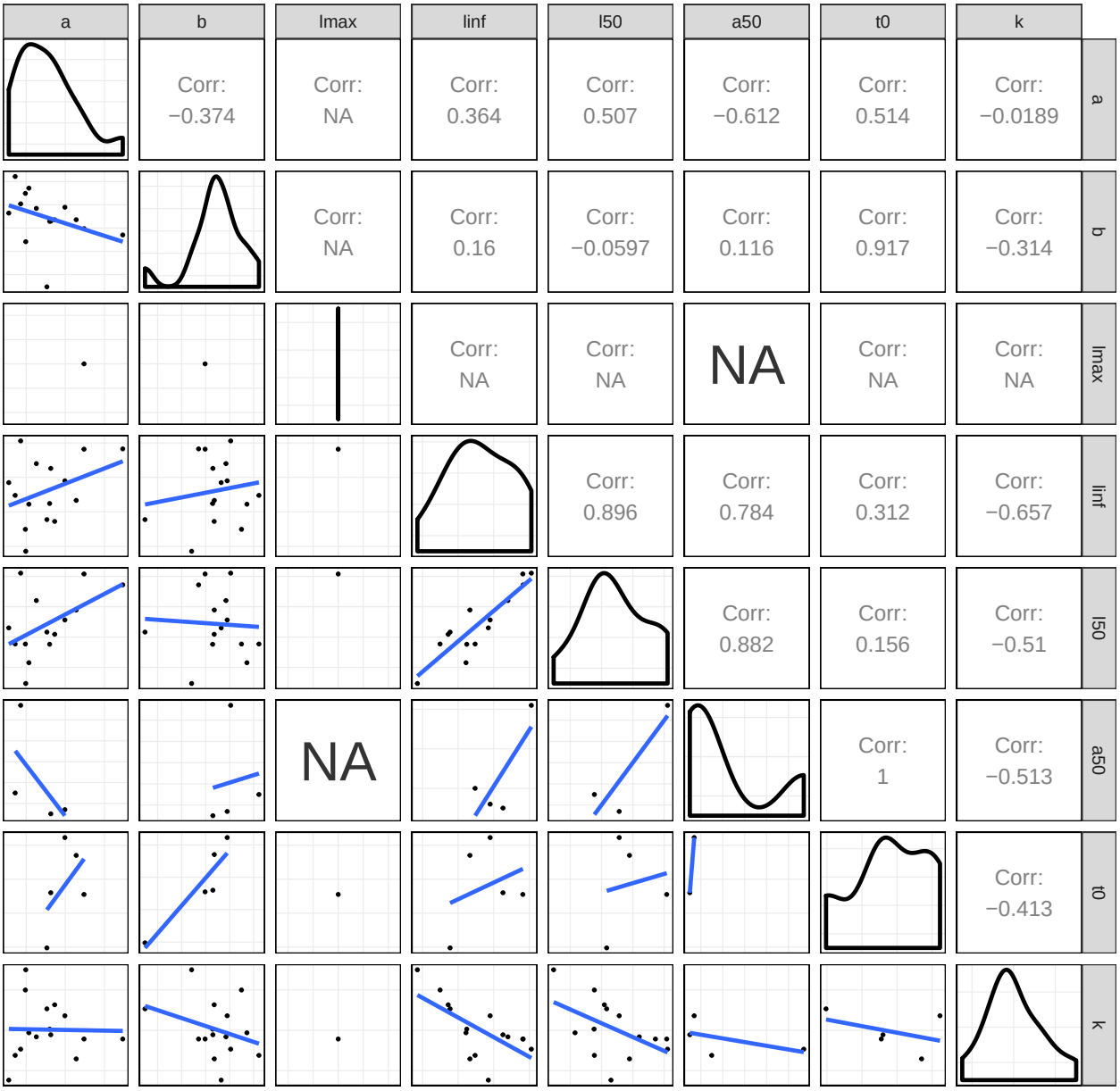

Figure 1 Pairwise scatter plots of life history parameters.

Equilibrium Dynamics

Create an `FLPar`

```
wkpar=as(wklife[,6:13],"FLPar")
attributes(wkpar)[names(wklife)[1:5]]=wklife[,1:5]
```

Then use life history relationships to estimate missing values

```
par=lhPar(wkpar)
```

and then to derive vectors for processses such as natural mortality

```
library(FLBRP)

eql=lhEql(par)
```

```
sel<-function(x)
  catch.sel(x)%/%fapex(catch.sel(x))

ggplot(FLQuants(eql,"m","catch.sel"=sel,"mat","catch.wt"))+
  geom_line(aes(age,data,col=attributes(wkpar)$name[iter]))+
  facet_wrap(~qname,scale="free")+
  scale_x_continuous(limits=c(0,15))+
  guides(colour=guide_legend(title="Species",title.position="top"))
```

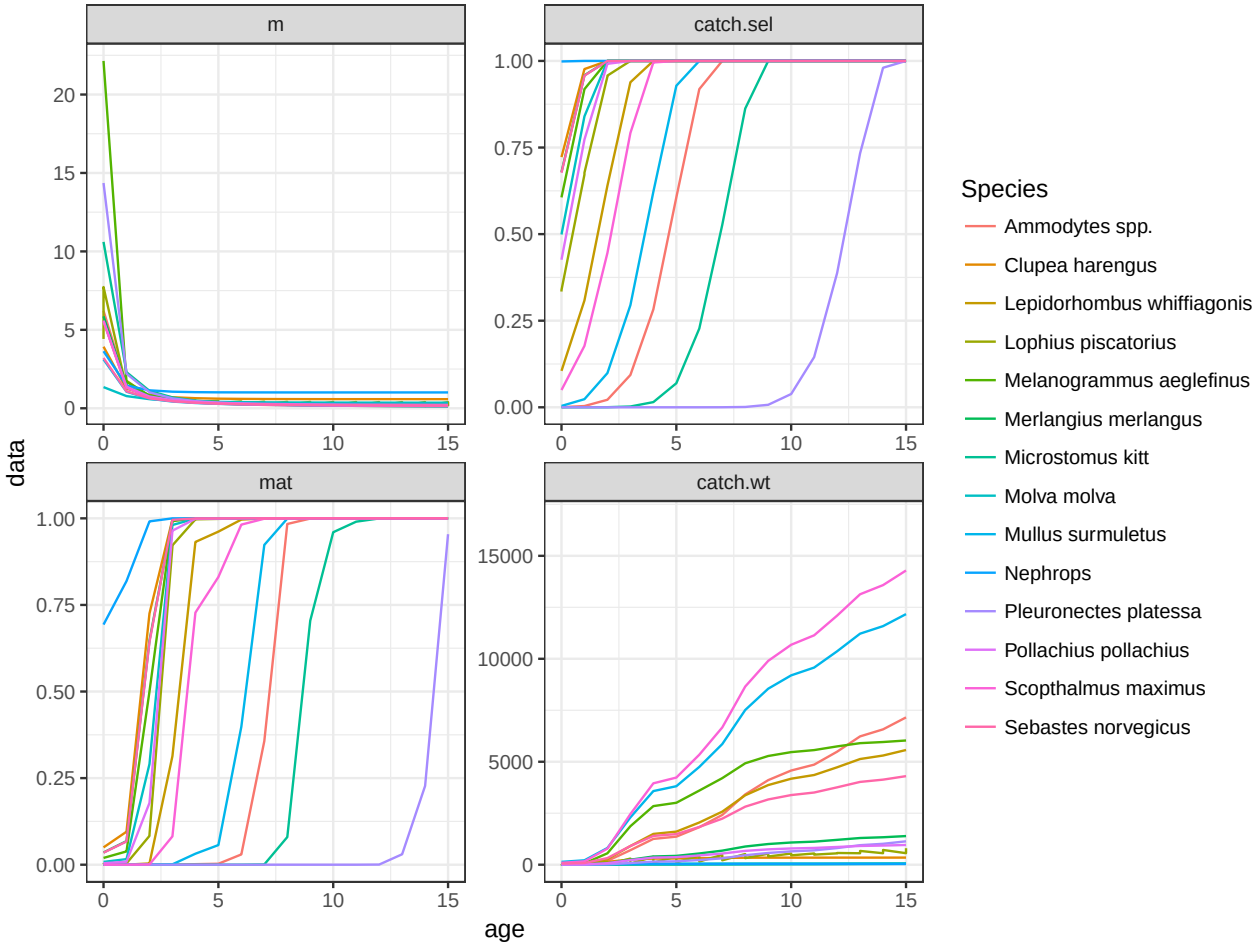

Figure 2 Vectors of m, selection pattern, maturity and weight-at-age.

and estimate equilibrium dynamics and reference points, e.g. for lemon sole

```
plot(iter(eql,7))
```

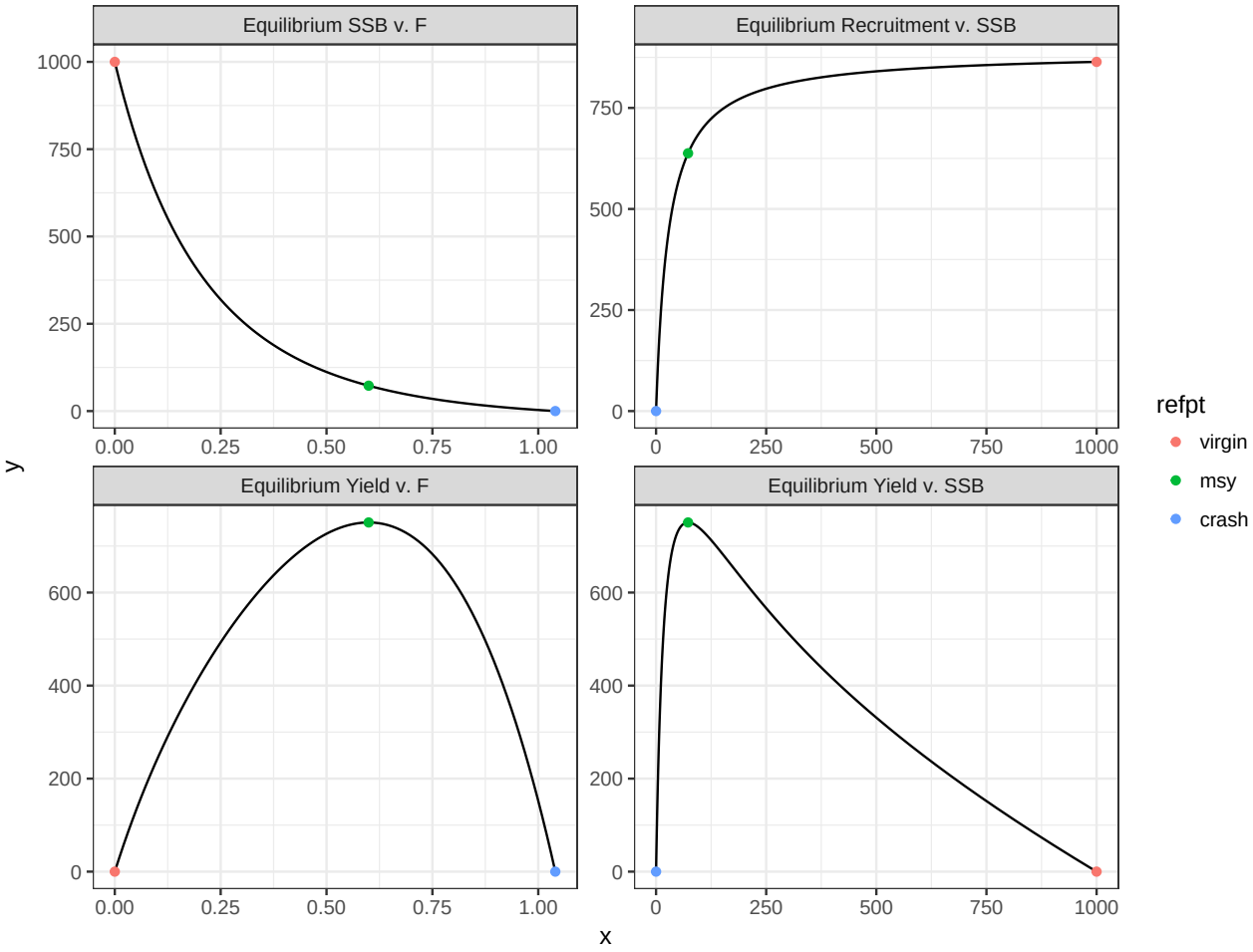

Figure 3 Equilibrium curves for lemon sole.

Simulation

Create a forward projection, i.e. an `FLStock` from an equilibrium object

```
lmsl=as(iter(eql,7),"FLStock")

plot(lmsl)
```

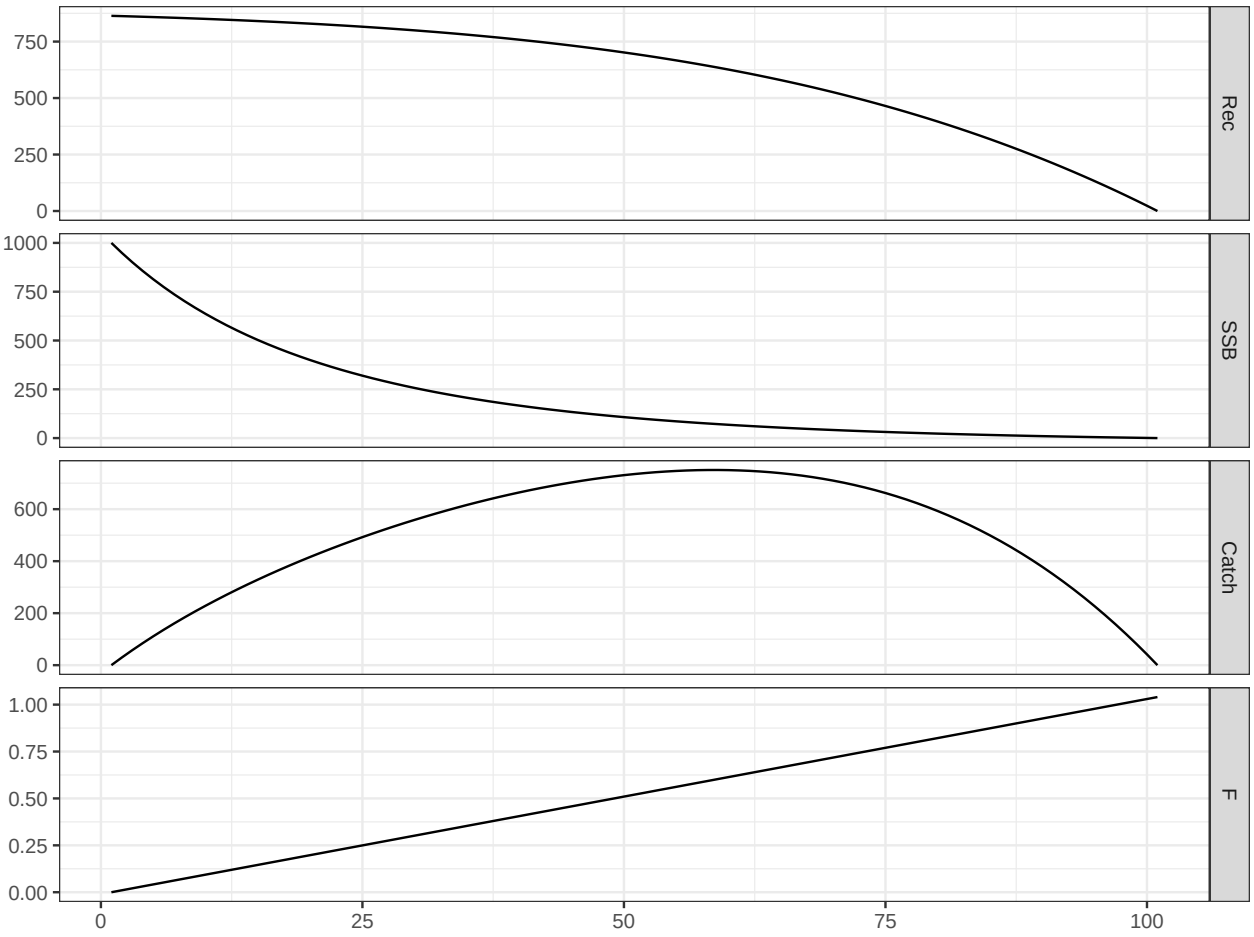

Figure 4 Simulate a stock with increasing F

Software Versions

- R version 3.4.1 (2017-06-30)
- FLCore: 2.6.5
- FLPKG:
- **Compiled**: Wed Jan 10 19:45:17 2018
- **Git Hash**: c6526f5

Author information

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References