

FLife

WKLIFE Life History Relationships

17 enero, 2018

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	Scophthalmus 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

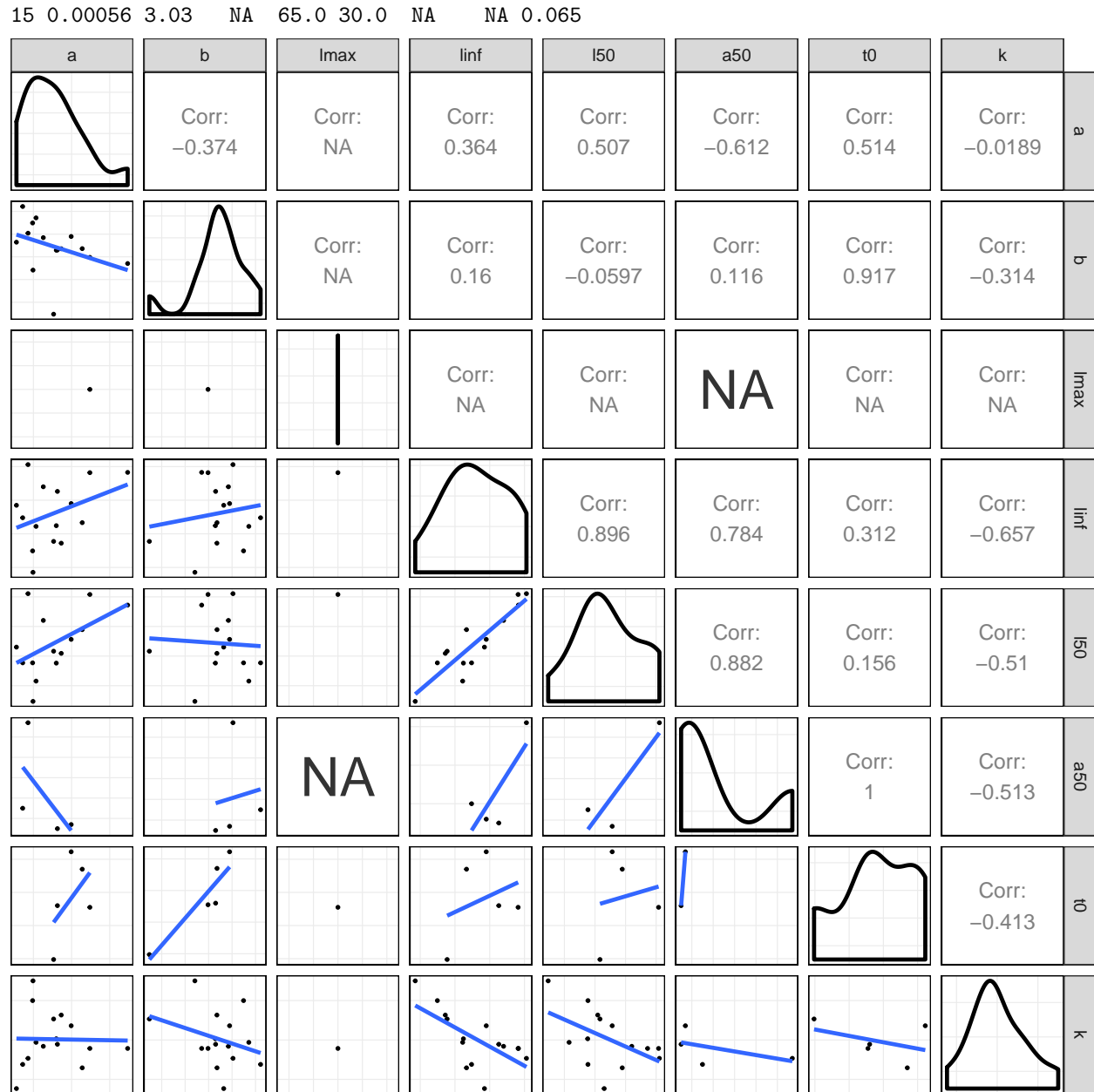


Figure 1 Pairwise scatter plots of life history parameters.

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 processes such as natural mortality

```
library(FLBRP)
```

```
eql=lhEql(par)
```

```
ggplot(FLQuants(eql,"m","catch.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"))
```

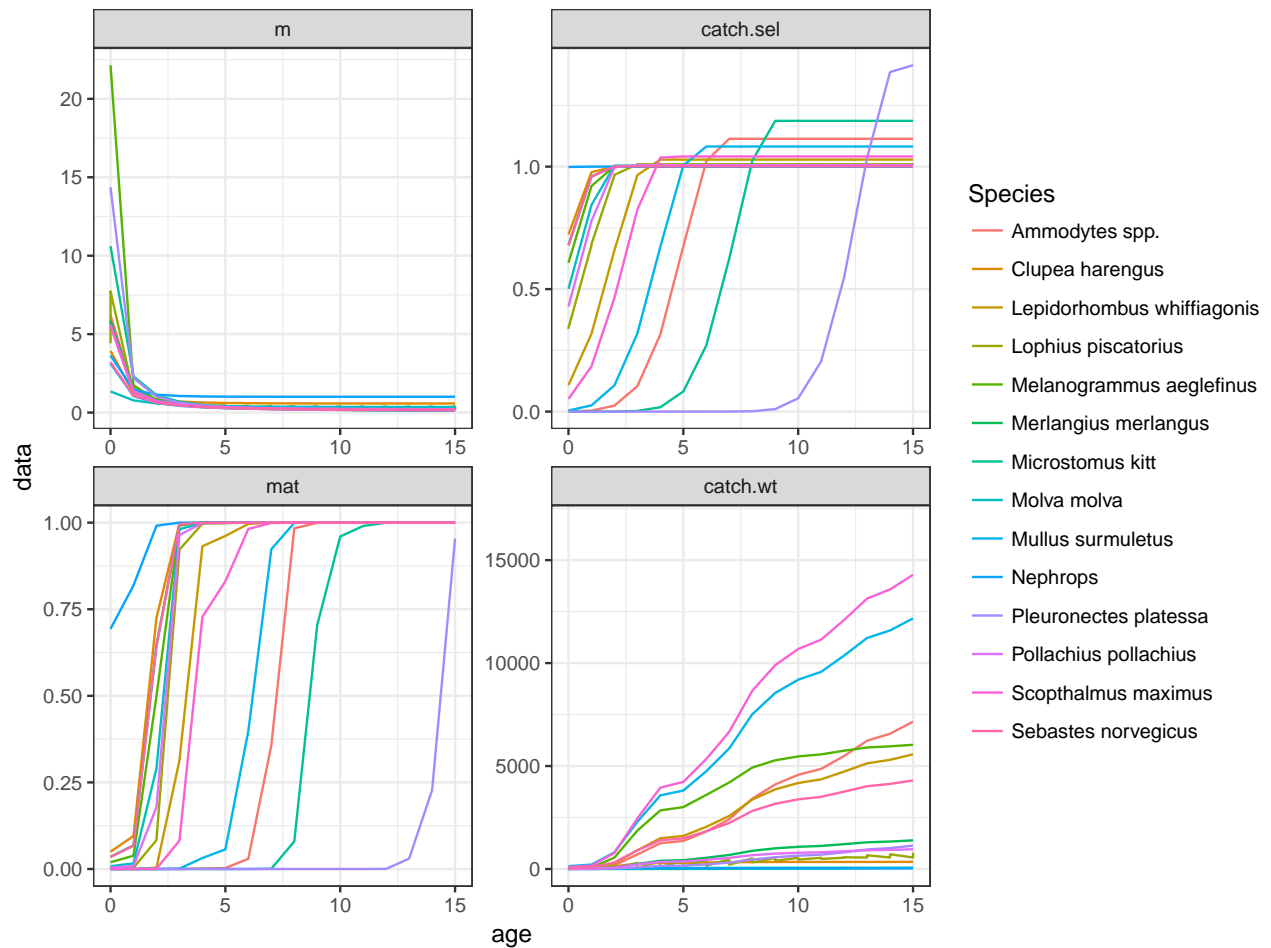


Figure 2 Vectors of m , selection pattern, maturity and weight-at-age.

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

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

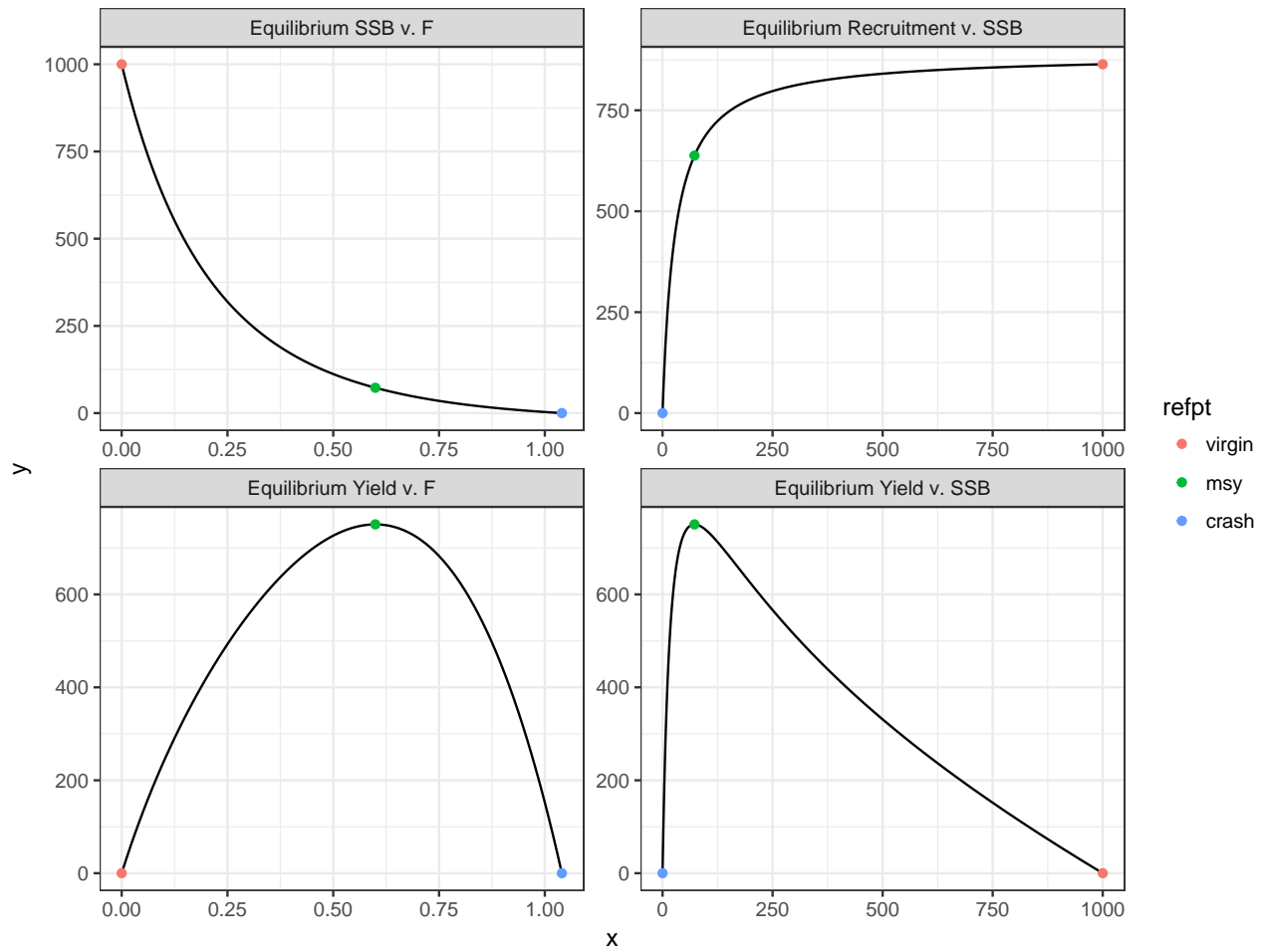


Figure 3 Equilibrium curves for lemon sole.

Simulation

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

```
lmsl=as(iter(eq1,7),"FLStock")
```

```
plot(lmsl)
```

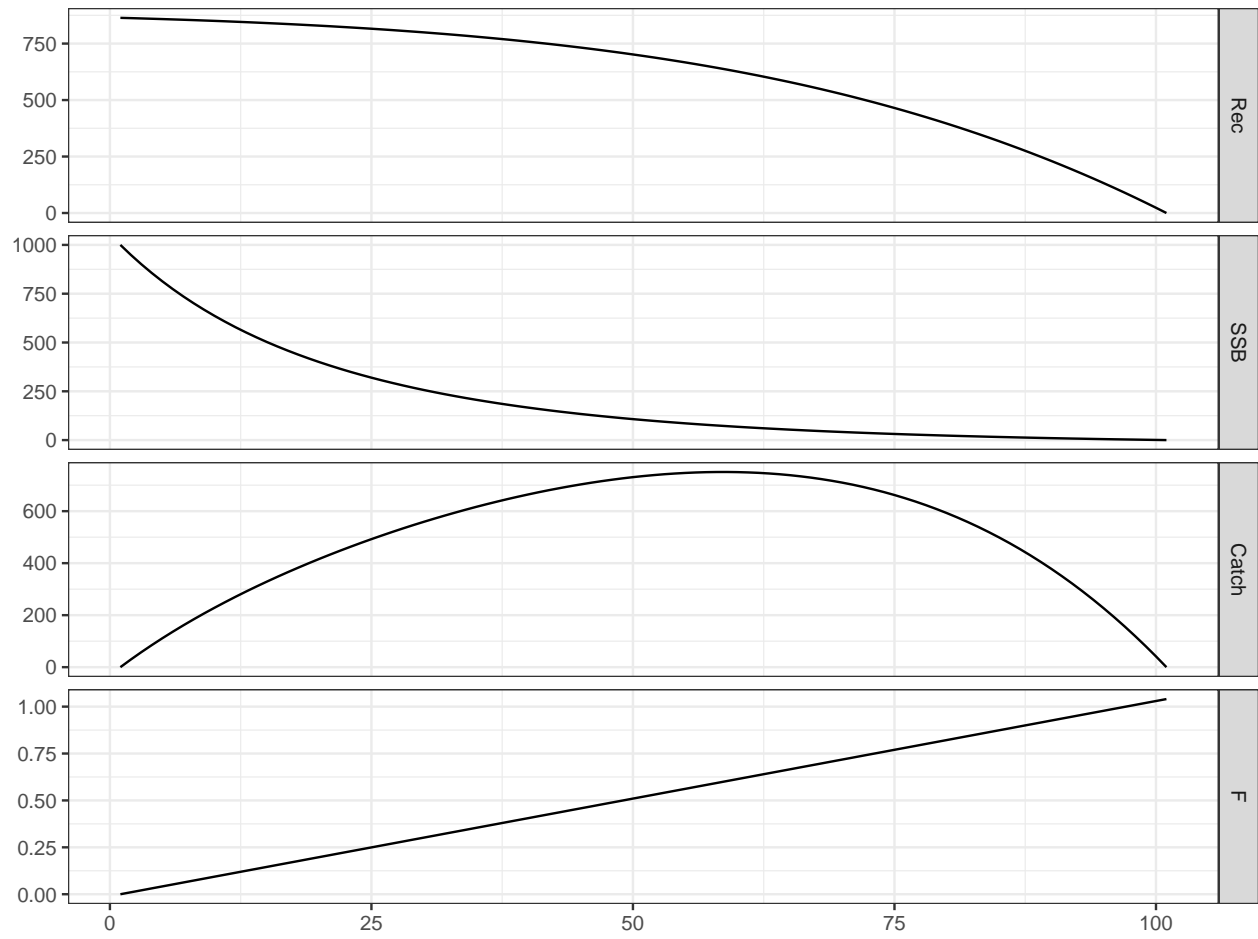


Figure 4 Simulate a stock with increasing F