SC-ECO

Productivity Analysis

L Kell

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## Objective

Compare different ways to estimate productivity for **data poor** stocks and compare with estimates from **data rich** assessments.

## Data Rich Assessments

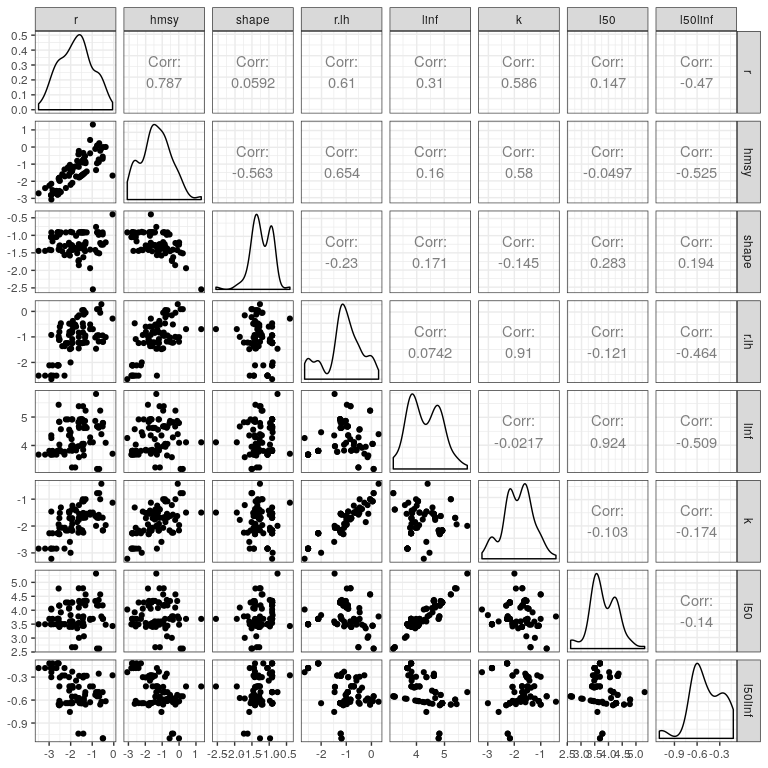
* Use data rich assessments from the Myers legacy database to sumarise reference points, i.e. , , , and .
* Use the reference points to estimate the Pella-Tomlinson production functions and hence and the shape of the production function ().

### Life History characteristics

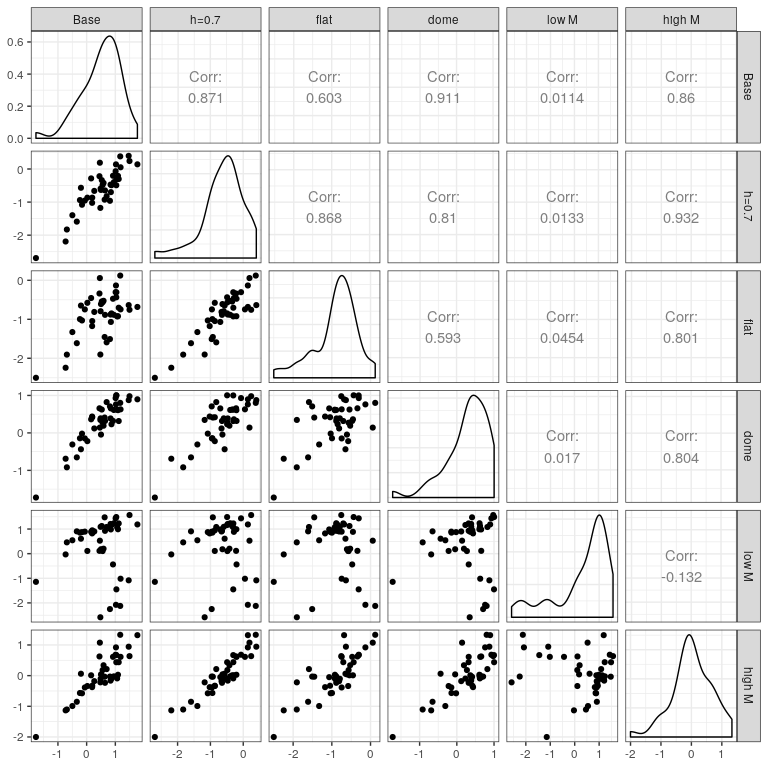
* A number of life history characteristics have been used as proxies for productivity, i.e.
  + Maximum Size () <110 cm 110–200 >200 cm
  + von Bertalanffy growth coefficient () >0.36 0.27–0.36 <0.27
  + Size at first maturity () <54 54–105 >105
  + Maximum age () <8 8–14 >14
  + <0.51 0.51–0.55 >0.55
  + Fecundity (Fec) >2.88 1.03–2.88 <1.03
  + >0.48 0.26–0.38 <0.38
* Use life history parameters from Fish Base, and identify cases where , , , and from the length weight relationship are available and then calculate under a variety of assumptions and compare to and from the data rich case studies.
* Scenarios corresponding to steepness (), selection pattern (dome shaped, flat) and .

### Productivity Proxies

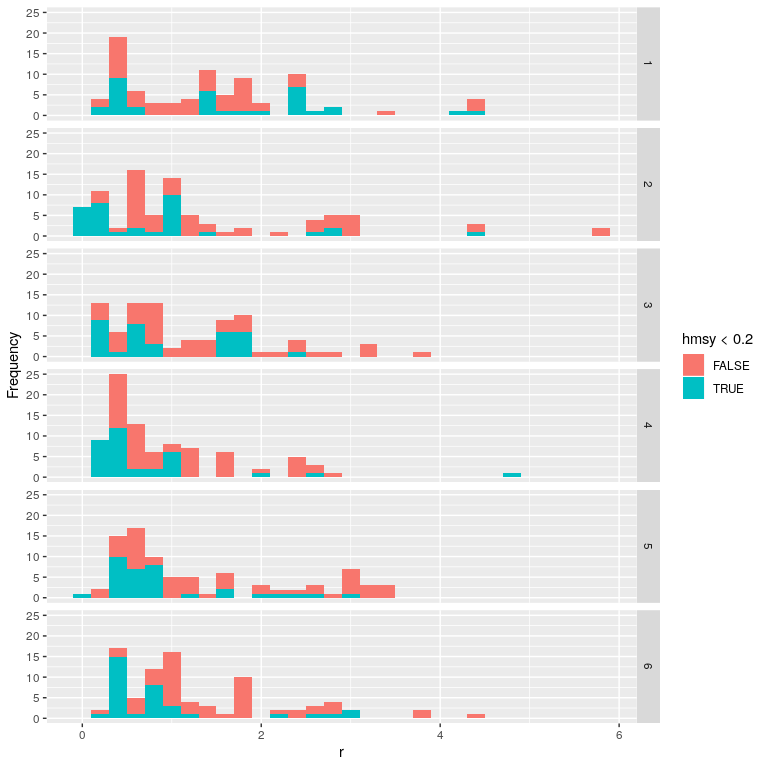
* Compare life history parameters and estimates of with **Data Rich** estimates to develop a robust proxy for productivity.



**Figure 1** Relationships between , , and the shape of the Pella-Tomlinson production function from data rich assessments, with data poor estimates of (r.lh) and life history parameters $L\_{\nfty}$, and .



**Figure 2** Relationship between data poor estimates population growth rate () under the different scenarios.



**Figure 3** Estimates of for data poor scenarios, colours compare with .

## Software Versions

* R version 3.6.3 (2020-02-29)
* FLCore: 2.6.14
* FLBRP: 2.5.4
* FLasher: 0.6.0
* FLife: 3.3.1
* mydas: 1.1.6
* **Compiled**: Mon Mar 16 11:12:33 2020

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# References