CRC for Premium Quality Wool

Fibre Effects in Spinning

Produced for the CRC for Premium Quality Wool undergraduate program by;
Dr. Peter Lamb, CSIRO textile & Fibre Technology

Fibre Diameter

- determines 70% of raw wool price
- number of fibres in yarn X-section
  - spinning limit (~35 fibres)
    - yarn autolevelling possible
  - ends-down during spinning
  - yarn evenness
- FINE YARNS REQUIRE FINE FIBRES
  - tex (yarn count) α (diameter)^2
- “golden bale”

CRC for Premium Quality Wool

Peter Lamb

Fibre Diameter Distribution

- variation mostly within one staple
- $CV_D\%$ varies from 14% to 28%
  - consignment average = 10.5 + D/2
- 5 - to - 1 rule

$$\left.\begin{array}{l} D = 20\ \mu m \\ CV_D = 25\ \% \end{array}\right\} \equiv \left\{\begin{array}{l} D = 21\ \mu m \\ CV_D = 20\ \% \end{array}\right.$$

CRC for Premium Quality Wool

Peter Lamb

Mean Fibre Length - Hauteur

yarn tenacity & ends-down

1µm ≅ 10 mm

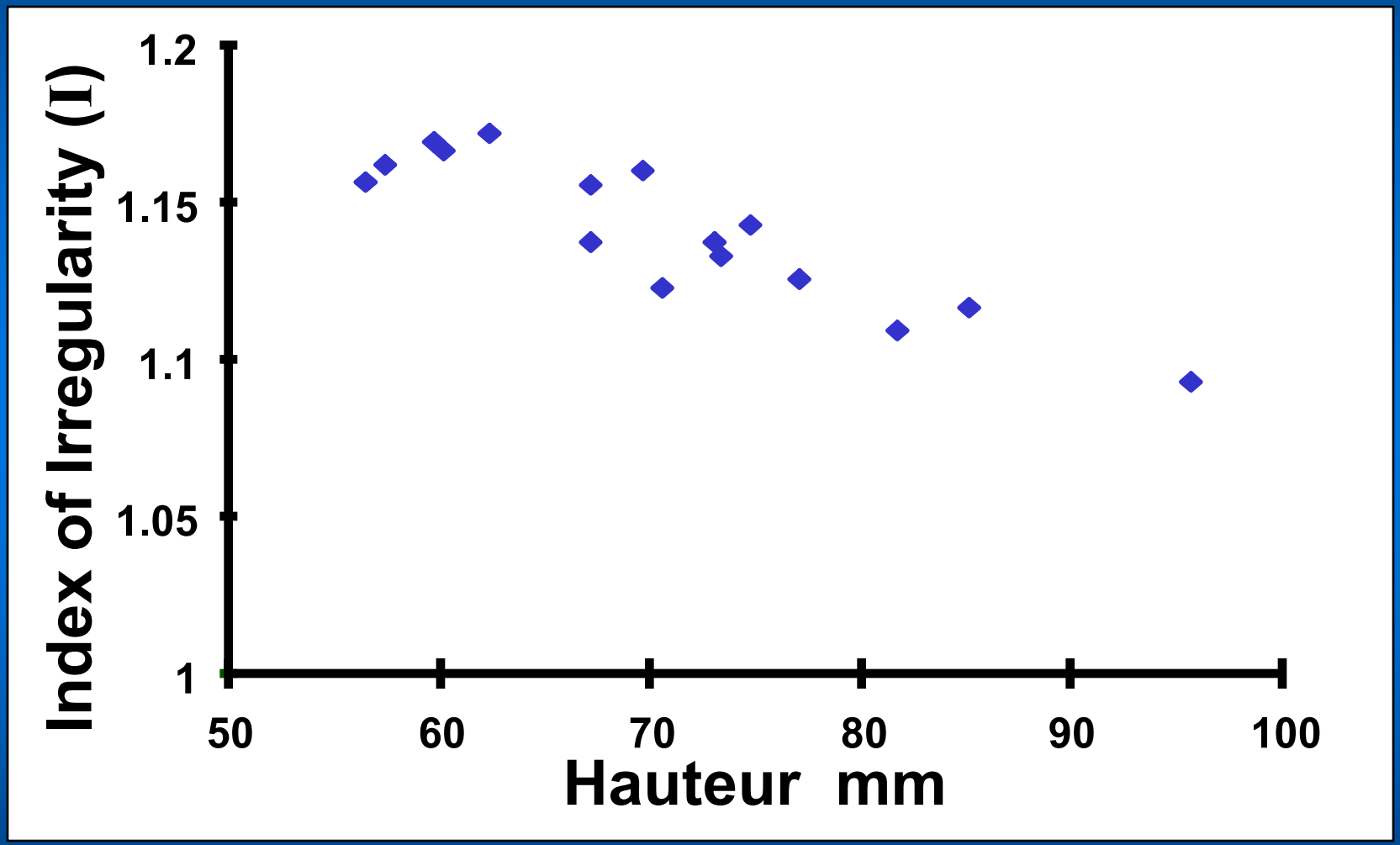
yarn evenness

1µm ≅ 25 mm

CRC for Premium Quality Wool

Peter Lamb

Effect of H on Evenness

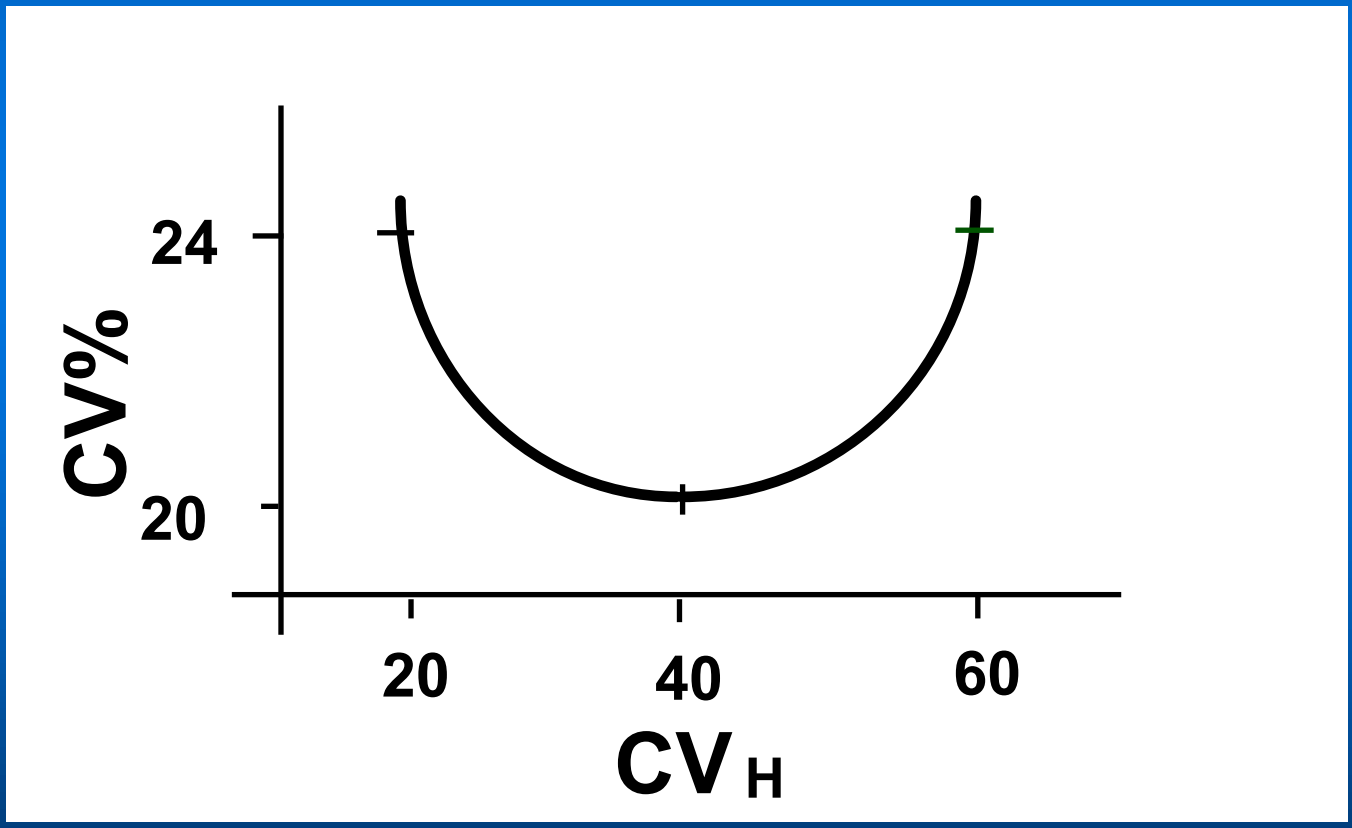


CRC for Premium Quality Wool

Peter Lamb

Fibre Length Distribution

- no optimum CV_H%
  - "Cup of Spinning Performance"
  - nonsense



CRC for Premium Quality Wool

Peter Lamb

Fibre Crimp

- Crimp definition
  - all fibres curving together
  - irrelevant after scouring
- Crimp frequency
  - crimps/cm
  - survives processing
- Less crimp gives more even yarns
  - yarn bulk is lower

CRC for Premium Quality Wool

Peter Lamb