Let λ be the scale, κ be the shape factors of the Weibull distribution. Then the variance is given by

$$\sigma = \lambda^2[\Gamma(1 + 2/\kappa) - (\Gamma(1 + 1/\kappa))^2] \tag{1}$$

Equation (1) on its own shows increase of λ increase in the variance (when $\lambda > 1$).

For the original model, the parameters of larva generation 1 is given by:

$$(\kappa, \lambda) = (4.42486,\ 742.9410)$$

If we increase the scale by 10% and 20% we get

$$(\kappa_{10}, \lambda_{10}) = (4.42486,\ 817.2351)$$

and

$$(\kappa_{20}, \lambda_{20}) = (4.42486,\ 891.5292)$$

respectively. Computing the variance then would be easy.

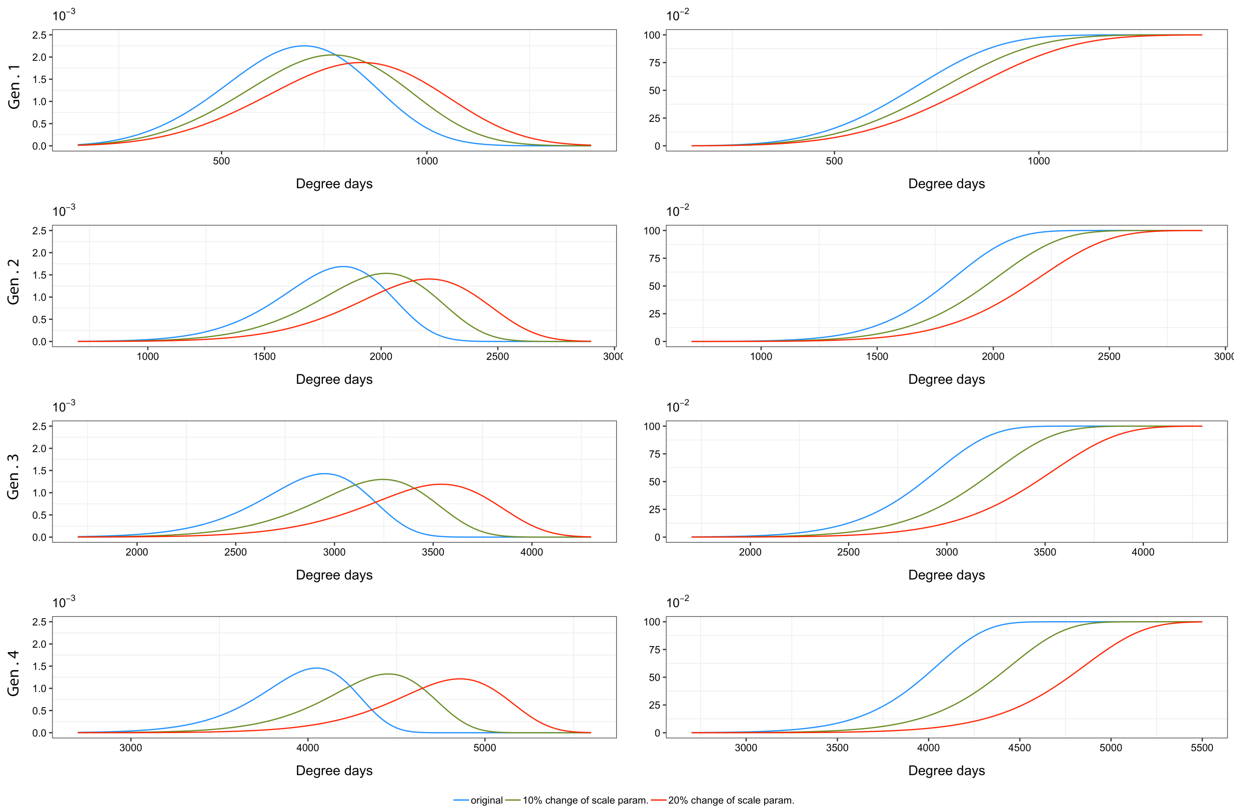

Figure 1: Weibull density and cumulitive distributions.

Also, the lowered peaks show, the distributions are not just shifted.

1 Another take from cumulative function

The cumulative function of Weibull is given by

$$f(x, \lambda, \kappa) = 1 - exp(-(x/\lambda)^{\kappa})$$

hence,

$$f'(x, \lambda, \kappa) = \kappa/\lambda(x/\kappa)^{\kappa-1} - exp(-(x/\lambda)^{\kappa})$$

Using R and quantile function we can find the x's for which cumulative probability is 0.5.

`qweibull(0.5, shape=shape, scale=scale_orig)` produces $x = 683.8826$.
`qweibull(0.5, shape=shape, scale=scale_10_percent)` produces $x_{10} = 752.2708$.
`qweibull(0.5, shape=shape, scale=scale_20_percent)` produces $x_{20} = 820.6591$.

Plugging the shape and scales with associated x into the derivative equation above we get

$$\begin{cases} f'(x, \lambda, \kappa\_orig) & = 0.002242402 \\ f'(x_{10}, \lambda, \kappa_{\_10\_percent}) & = 0.002038547 \\ f'(x_{20}, \lambda, \kappa_{\_20\_percent}) & = 0.001868668 \end{cases} \tag{2}$$

Though, they are close, and visually may seem shifted, they are not.