

Biometry - dex3 - solutions

①

| Weight | $(Y_i - \bar{Y})^2$ |
|---------------------|---------------------|
| 3.3 | 0.01 |
| 2.9 | 0.25 |
| 3.8 | 0.16 |
| 3.9 | 0.25 |
| 3.6 | 0.04 |
| 3.3 | 0.01 |
| 3.1 | 0.09 |
| 3.3 | 0.01 |
| $\Sigma Y_i = 27.2$ | 0.82 |

$$\bar{Y} = \frac{27.2}{8} = 3.4 \text{ g}$$

$$s^2 = \frac{1}{7} (0.82) = 0.1171$$

$$s = 0.3423 \text{ g}$$

$$CV = \frac{0.3423}{3.4} = 0.101 = 10.1\%$$

The female hummingbirds are heavier, but have approximately the same weight variability as the males.

| Weight | $(Y_i - \bar{Y})^2$ |
|---------------------|---------------------|
| 4.2 | 0.16 |
| 4.3 | 0.25 |
| 3.4 | 0.16 |
| 3.9 | 0.01 |
| 3.6 | 0.04 |
| 3.4 | 0.16 |
| 4.0 | 0.04 |
| 3.6 | 0.04 |
| $\Sigma Y_i = 30.4$ | 0.86 |

$$\bar{Y} = \frac{30.4}{8} = 3.8 \text{ g}$$

$$s^2 = \frac{1}{7} (0.86) = 0.12286$$

$$s = 0.35051$$

$$CV = \frac{0.35051}{3.8} = 0.092 = 9.2\%$$

② $\frac{1}{H_Y} = \frac{1}{6} \left(\frac{1}{7.3} + \frac{1}{6.9} + \frac{1}{6.8} + \frac{1}{6.9} + \frac{1}{6.6} + \frac{1}{7.5} \right) = \frac{1}{6} (0.8587) = 0.1431$

$$H_Y = \frac{1}{0.1431} = 6.99 \text{ h.}$$

③ After 1 year: $20 (1.05) = 21$

After 2 years: $21 (1.10) = 23.1 \rightarrow 23$

After 3 years: $23 (1.04) = 23.9 \rightarrow 24$

Average growth rate = $\sqrt[3]{(1.05)(1.10)(1.04)} = 1.063 \rightarrow 6.3\%$

Alternative computation: $\sqrt[3]{24/20} = 1.063 \rightarrow 6.3\%$