ANIMAL GENETICS & BREEDING

UNIT - I

BIO-STATISTICS AND COMPUTER APPLICATION

Theory

CORRELATION

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- **Correlation:** Association or relationship or interdependence between two or more variables.
- Variables: Continuous and discrete
- Attributes: qualitative and quantitative traits Types of correlation

1. According to direction:

(i) Positive

(ii) Negative

(iii) Zero

2. According to number of variables:

(i) Simple

(ii) Multiple

(iii) partial

3. According to proportionate change between two variables:

(i) Linear

(ii) Non-linear

(A)According to direction:

(i) Positive correlation – Both the variables move in the same direction.

Example 1.–

height and weight Height (inch) : 50, 51, 52, 53, 54, 55

Body wt.(kg) : 60, 61, 62, 64, 65, 67

Example 2. variable

(X) : 60, 55, 50, 45, 40, 35, 30 variable

(Y) : 40, 35, 30, 25, 20, 15, 10

- Body weight increases with the increase in height. Both are moving in the same direction.

- (ii) Negative correlation – Both the variables move in the opposite direction. Example – Milk yield & fat percentage Daily M Y (kg): 10, 12, 14, 16, 17, 18, 20

  Fat % : 6.5, 6, 5.5, 5, 4.5, 4.5, 4

- One variable is increasing while the other is decreasing. With the increase in milk production, the fat % in milk is going down.

- (iii)Zero correlation – One variable increases or decreases but the other variable remains constant.
- Example 1. Variable X – 2, 5, 6, 8, 10, 12
  Variable Y – 5, 5, 5, 5, 5, 5
- Example 2. Variable X : 15, 12, 10, 8, 6, 4, 2
  Variable Y : 6, 6, 6, 6, 6, 6, 6
- With the increasing or decreasing in one variable there is no change in the second variable.

(B) According to no. of variables

(i) Simple – only two variables are studied at a time. Eg. Height & Body wt.

(ii) Multiple – three or more variables studied at a time. Example – feed quality, quantity given, feed conversion, body weight, etc.

(iii) Partial correlation – studied three or more variables but find out correlation between two variables at a time while others kept constant.

Eg. Correlation between crop yield and amount of fertilizer given while number of irrigation given is kept as constant.

(C)According to proportionate change between variables:

- (i) Linear - Both the variables move at a constant ratio throughout.
- Example: X 5, 10, 15, 20, 25 Y 10, 20, 30, 40, 50 constant ratio ½.
- (ii) Non-linear – Variables do not follow a constant ratio throughout.
- Example: X = 10, 15, 20, 25, 30, 35, 40 Y = 8, 10, 12, 13, 18, 20, 25

Coefficient of correlation

- It measures the degree of association or degree of interdependence or relationship between two or more variables.
- Denoted as ‘r’,
- i.e., rxy so that, rxy = ryx
- Concept given by Karl Pearson.

Properties of correlation coefficient:

- (i) Ranges from -1 to +1
- (ii) Pure number
- (iii) No unit
- (iv) + 1 is perfect positive correlation
- (v) - 1 is perfect negative correlation
- (vi) when r = 0, it means no correlation
- (vii) rxy = ryx

- rxy = Covxy /sdx sdy
- Cov xy = [∑xy – (∑x)(∑y)/N] (N−1)
- sdx = root of [∑x2 − (∑x)2/N] N – 1
- sdy = root of [∑y2 − (∑y)2/N] N − 1

- Other methods to estimate Coefficient of Correlation:
- 1. Scatter diagram method
- 2. Graphic method
- 3. Rank correlation method
- 4. Least squares method


THANKS
YOU