

Inclusive fitness

2004

June

24

Thursday

Wk-26 176-190

→ It is a sum of own fitness plus its influence on the fitness of its relatives who are not directly descendants.

→ It is made up two components:-

- ① Direct fitness (by producing its own offspring)
- ② Indirect fitness (by providing aid/help that enables other close relatives, who share many of genes to produce offspring)

→ It is a social behavior evolves specific, combination of relatedness, benefit and cost

Hamilton Rule

$$rb > c$$

where, r = coefficient of relatedness between donor & recipient

b = benefit by the recipient

c = cost incurred by the altruist (donor).

$$\text{Direct fitness} = (N_1 \times r) + (N_2 \times r)$$

$$\text{Indirect fitness} = N_1 \times r$$

Inclusive fitness

| | | | | | | | | | | | | |
|------|---|---|---|---|---|----|--------------|--|--|--|--|--|
| JULY | | | | | | | Appointments | | | | | |
| S | M | T | W | T | F | S | | | | | | |
| | | | | 1 | 2 | 3 | | | | | | |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | | | |

Group selection

25

June

2004

Friday → Many animals come close to form groups for many external reasons.

Wk-26 177-189

→ The aggregation may be of temporary or permanent nature.

09.00

Advantages of Group selection:-

10.00

① Aggregation is found to increase "Group survival value" by protecting animals against many ecological hazards. Ex- many insects and vertebrates avoid cold during winter by the formation of groups.

11.00

12.00

13.00

② It helps in the transfer of learning from one generation to another. ex- learning of food capturing techniques are passed from the parent to the offsprings.

15.00

16.00

③ It helps in the collection of food.
④ It provides protection to the members of the group.

⑤ In a group, opposite sexes come close for breeding purposes by stimulating each other.

⑥ It helps in predation.

⑦ In the social aggregation of ants, termites division of labour is seen.

⇒ Acc. to E.O. Wilson (1980) Selection can be said to operate at the group level and deserves to be called group selection.

| JUNE | | | | | | |
|------|----|----|----|----|----|-----|
| S | M | T | W | T | F | S |
| | | | 1 | 2 | 3 | 4 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | | | |

2004

Kin-Selection

2004

June

26

Where genes are differentially represented as a result from following the survival and reproduction of relatives, who have some genes from common ancestry.

Saturday

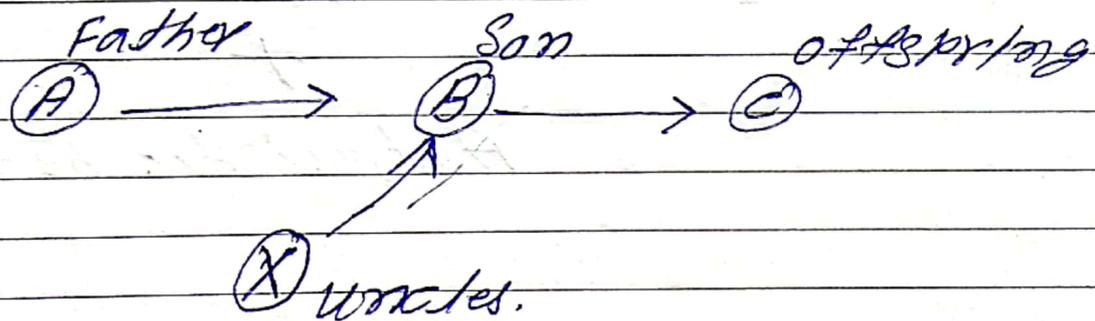
Wk-26 178-188

→ It is a type of Natural Selection.

→ It is the evolutionary strategy.

→ ensuring the survival of genes that they both share.

Ex: - Honey bees



→ That favors altruistic behavior by increasing reproductive success of their close relatives is called Kin selection.

Sunday 27

Kin selection $\propto \frac{1}{\text{hereditary distance}}$

JULY

28

June
Monday
Wk-27 180-186

2004

08.00

09.00

10.00

11.00

12.00

13.00

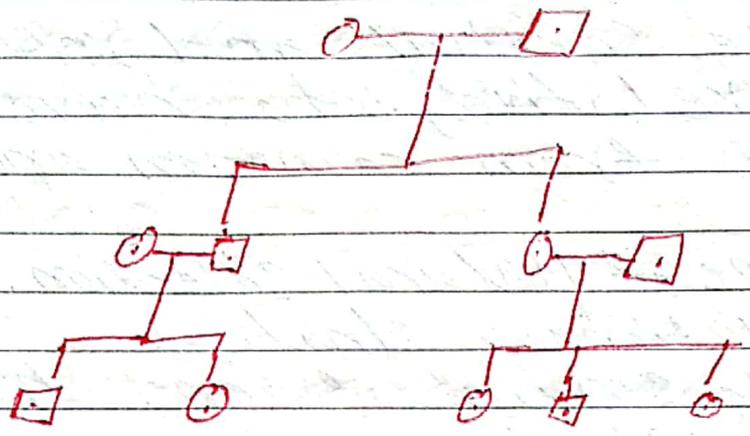
14.00

15.00

16.00

17.00

18.00



altruistic
behavior
decreases

K m. Selection = Natural Selection

+

Altruistic behavior.

Appointments

JUNE

| S | M | T | W | T | F | S |
|---|---|---|---|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | | | | | |

200