Summary

Chapter 1

Male age influence on male reproductive performance and offspring quality has been studied in outbred, monomorphic and polymorphic strains of D. ananassae.

1. Analysis of mating success revealed that females of D. ananassae discriminate males on the basis of age classes. She prefers to mate with old age males more frequently over young and middle aged males. Mean wing lengths of rejected males were slightly greater than the selected male by female in female mate choice experiment. Further, insignificant variation was found between mean wing lengths of selected and rejected males suggesting that observed greater mating success of old age male may not be due to longer wing length.

2. Studies of courtship, mating activities and fitness traits of males of different age classes showed that old age male mated faster, performed greater courtship activities, copulated longer, inseminated more number of females in a given unit of time over young and middle aged males. On the other hand female showed least rejection responses to old age males compared to young and middle aged males.

3. Analysis of fitness of female mated with males of different male age classes showed female mated with old aged males had greater fecundity, egg-larval hatchability, larva-adult viability and fertility than female mated
with either young or middle aged males. Furthermore female mated with old aged male lived significantly shortest than female mated with young or middle aged males. These studies suggest that old age male had greater courtship, mating and fitness traits than young or middle aged males. Female obtain greater fitness by mating with old age males.

4. Studies on offspring fitness of female mated with males of different age classes showed that females of *D. ananassae* discriminate the sons of different male age classes and she prefers to mate with sons of old age males. Wing length of selected and rejected sons by female did not show significant variation. This suggests that observed greater mating success of sons of old age male was not due to difference in wing length of different male age classes instead it could be due to difference in their father age.

5. Courtship and mating activities analysed in sons of different male age classes showed significant variations. Sons of old age male mated faster, performed greater courtship activities over sons of young and middle aged males. In turn female showed least rejection responses to sons of old age male compared to sons of middle and young age males. This indicates that courtship and mating activities varies with sons of different male age classes.

6. Studies on mating ability of sons of different male age classes revealed that mating ability of sons of old age males was found to be significantly greater than sons of young and middle aged males suggests sons of old
age male inseminate greater number of females in given time over sons of young and old age males suggesting influence of male age on son’s mating ability.

7. Fecundity and fertility of female mated with sons of different male age classes were analysed. It revealed that female mated with sons of old age male had significantly greater fecundity and produced greater progeny compared to female mated with sons of young or middle age males. Therefore it is evident that male age has influence on son’s fitness traits.

8. Longevity of sons of different male age classes was also studied. It shows that sons of old age males lived longest than sons of young or middle aged males suggesting greater longevity of sons of old age male inherited from old age males.

9. Mating success in daughters of different male age classes has been analysed. It revealed that daughters of old age male had significantly greater mating success than daughters of young and middle age males. This suggests influence of father age on daughter’s mating success too.

10. Fecundity of daughters of different male age classes has also been studied. Daughters of old age male had significantly greater fecundity compared to daughters of young or middle age males.

11. Daughter’s longevity was analysed among daughters of different male age classes. It shows that daughters of old age male lived longer than daughters of young and middle aged males.
Chapter 2

Female age influence on female reproductive performance and offspring quality has been studied in outbred, monomorphic and polymorphic strains of *D. ananassae*.

1. Investigation of mating success revealed that males of *D. ananassae* were able to discriminate females on the basis of age classes. He prefers to mate with middle age females more frequently over young and old aged females. Middle aged females had significantly greater ovarioles number compared to young or old aged females. Mean wing lengths of rejected females were slightly greater than the selected female by male but the difference was found to be insignificant suggesting that observed greater mating success of middle age female may not be due to longer wing length. This appears that in *D. ananassae* female age is an important determinant of male mate choice.

2. Courtship and mating activities of young, middle and old age females has been studied. It revealed that middle age female mated faster, copulated longer over young and old aged females. On the other hand male showed highest courtship activities to middle aged female compared to young and old aged females. Middle aged female showed least rejection responses to male. This suggests influence of female age on courtship and mating activities.
3. Fecundity and fertility of young, middle and old age female was also analysed. It shows that middle age female had significantly greater fecundity and fertility than young or old age females suggesting influence of age on female fitness traits.

4. Studies on offspring fitness of male mated with females of young, middle and old age revealed that female was able to discriminate sons of different female age classes and she prefers to mate with sons of middle age female more frequently than sons of young or old age female. This suggests that influence of female age on son’s mating success.

5. Courtship and mating activities analysed in sons of different female age classes showed significant variations. Sons of middle age female mated faster, performed greater courtship activities over sons of young and old aged females. In turn female showed least rejection responses to sons of middle age female compared to sons of young and old age females. This suggests influence of female age on son’s courtship and mating activities.

6. Mating ability of sons of young, middle and old age female was also studied. It shows that mating ability of sons of middle age female was significantly greater than sons of young and old aged females suggesting that sons of middle age female could inseminate greater number of females in a given time over sons of young and old age females.

7. Fecundity and fertility of female mated with sons of different female age classes were analysed. It revealed that female mated with sons of middle
age female had significantly greater fecundity and produced greater progeny compared to female mated with sons of young or old age females. This suggests that female age has influence on sons fitness traits.

8. Longevity of sons of different female age classes was also studied. It shows that sons of middle age female lived longest than sons of young or old age females suggesting greater longevity of sons of middle age female.

9. Mating success in daughters of different female age classes has been studied. It revealed that daughters of middle age female had significantly greater mating success than daughters of young and old age females suggesting that female age has significant influence on daughter's mating success too.

10. Mating latency and copulation duration of daughters of different female age classes has been investigated. It was found that daughter of middle aged female mated faster and copulated longer compared to daughters of young and old aged females suggesting influence of female age on daughters mating activities.

11. Study of courtship activities of daughters of different female age classes shows that male showed highest courtship activities to daughter of middle aged female over daughters of young or old age females. In turn daughter of middle age female showed least rejection responses to male compared to daughters of young or old aged female.
12. Fecundity and fertility of daughters of different female age classes has also been studied. Daughters of middle age female had significantly greater fecundity and fertility compared to daughters of young or old age females indicating that female age has influence on daughter’s fitness traits too.

13. Daughter’s longevity was also been analysed among daughters of different female age classes. It revealed that daughters of middle age male lived significantly longer than daughters of young and old aged females.

Three strains used in the present investigation were different. Out bred population represent the natural population, where variations are more. Whereas, monomorphic and polymorphic strains differ in the presence or absence of inversion. In the present study polymorphic strain had significantly greater fitness over monomorphic and outbred strains. However inversion system did not have influence on effect of parental age on offspring quality.

Thus it is evident from both chapter 1 and 2 that males and females of *D. ananassae* discriminate their mate on the basis of age classes. Females of *D. ananassae* prefer to mate with old age males to obtain greater fitness and produce better offspring there by supporting the good gene hypothesis. Males of *D. ananassae* also prefer to mate with middle age females to obtain greater fitness and produce better offspring. Therefore in *D. ananassae* successful parents produce successful offspring. It is the first report in *D. ananassae* showing mate discrimination by age and inversion system has no role in the influence of parental age on offspring quality.