**Adult Parasitism Model Without Predation**

This model accounts for a resource population that follows semi-chemostat dynamics, in the absence of consumers with turn-over rate and maximum resource density Resource density decreases through consumption by susceptible and infected adult consumers, as well as by juvenile consumers. Both juvenile and adult consumers forage following a linear functional response with attack rate and , respectively. The parameter therefore phenomenologically scales the ingestion rate of juvenile and adult consumer, which have equal foraging rates for . For , adult consumers are better resource competitors than their juvenile counterparts, meaning the ingestion rate of juveniles is low. As maturation depends on the amount of energy individuals get from feeding, this causes a limitation in maturation. For , juvenile consumers are better resource competitors than adults, meaning the ingestion rate of adults is low. Reproduction also depends on the amount of energy individuals get from feeding, so this causes a limitation in reproduction. The susceptible adult consumer population increases through maturation of juveniles (first term in the differential equation ) and decreases through natural mortality (second term in ) and infection by the parasite (last term in ). Maturation rate is represented by a maximum function. The maturation rate depends on the available energy, which is given by the ingested food (functional response) multiplied with the efficiency with which consumers converse ingested food into energy (), and the energy needed for other essential systems (). If individuals have less energy available than needed for other essential systems, the maximum function sets the maturation rate to zero. The infected adult population increases through infection of susceptible adult consumers (first term in the differential equation ) and decreases through natural mortality (last term in ). The juvenile consumer population increases through reproduction by susceptible and infected adult consumers (first two terms in the differential equation ) and decreases through natural mortality and maturation. The reproduction depends on the conversion efficiency with which consumers can converse ingested food to net production. Reproduction rate, like maturation rate, is represented by a maximum function. The reproduction rate depends on the available energy, which is given by the ingested food (functional response) multiplied with the efficiency with which consumers converse ingested food into energy () and for infected consumers also multiplied by the fraction of energy not used by the parasite (), and the energy needed for other essential systems ( for susceptible adults and for infected adults due to energetic costs of immune system *d*). If individuals have less energy available than needed for other essential systems, the maximum function sets the reproduction rate to zero. Hence, the parameters for parasite-induced energetic costs *e* and energetic costs of immune responses *d*, modify the energetics of infected adults by decreasing the amount of energy available for reproduction through decreasing energy gained from foraging and increasing energy needed for other essential systems respectively. Natural mortality rate is assumed constant and equal to for all host individuals, irrespective of stage and infection status. The infection rate of susceptible adult consumers is proportional to the number of infected adults present with proportionality constant .