cheater frequency increased exploitation reduces tolerable cheater frequency cheater fitness

cooperate defect
cooperate \[ R \quad S \]
defect \[ T \quad P \]

within colony selection at low cheater abundance for more efficient exploitation social exploitation increases cheater frequency during colony maturation

increased exploitation reduces tolerable cheater frequency high-exploitation cheater genotype colony extinction

low-exploitation cheater genotype

R - reward for mutual cooperation S - sucker’s payoff T - temptation to defect P - punishment for mutual defection

cooperate defect

coopert1

defectp1