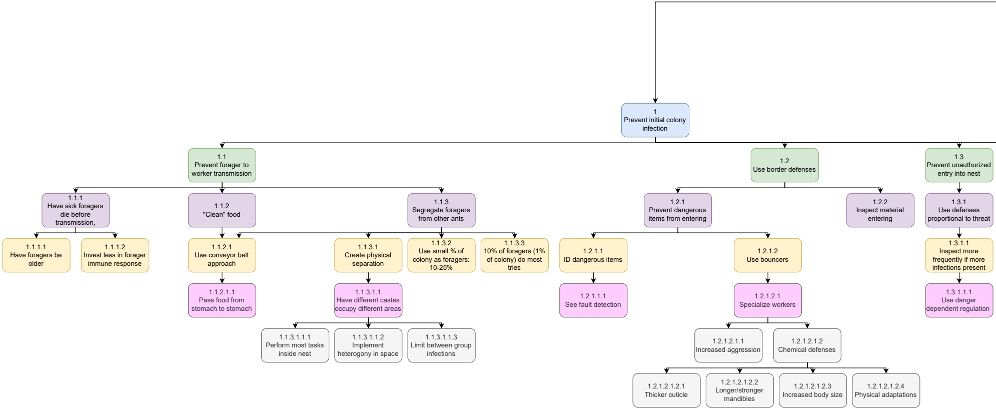
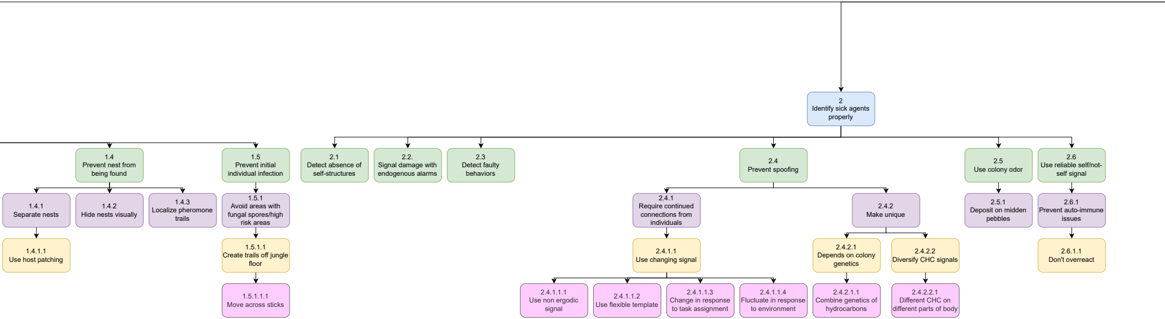
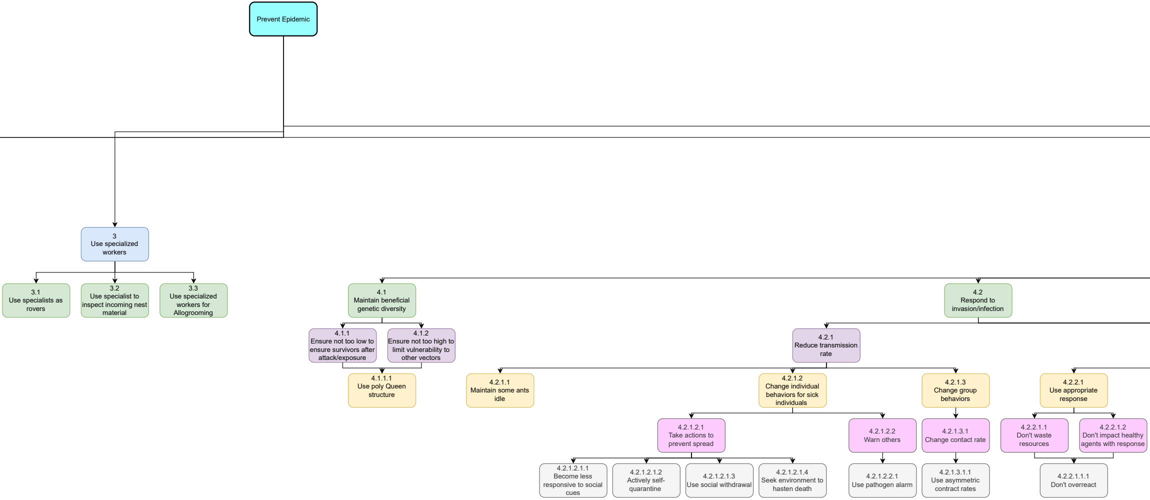
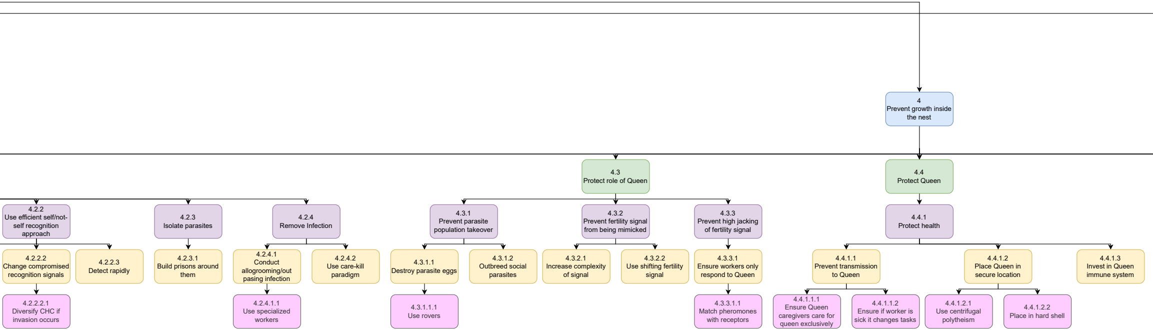
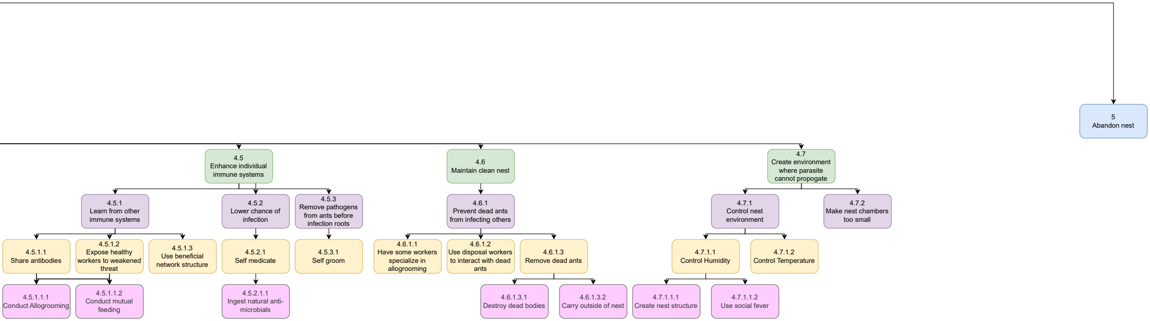

1
Prevent initial colony infection
1.1
Prevent forager to worker transmission
1.1.1
Have sick foragers die before transmission,
1.1.1.1
Have foragers be older
1.1.1.2
Invest less in forager immune response
1.1.2
"Clean" food
1.1.2.1
Use conveyor belt approach
1.1.2.1.1
Pass food from stomach to stomach
1.1.3
Segregate foragers from other ants
1.1.3.1
Create physical separation
1.1.3.1.1
Have different castes occupy different areas
1.1.3.1.1.1
Perform most tasks inside nest
1.1.3.1.1.2
Implement heterogony in space
1.1.3.1.1.3
Limit between group infections
1.1.3.2
Use small % of colony as foragers: 10-25%
1.1.3.3
10% of foragers (1% of colony) do most tries
1.2
Use border defenses
1.2.1
Prevent dangerous items from entering
1.2.1.1
ID dangerous items
1.2.1.1.1
See fault detection
1.2.1.2
Use bouncers
1.2.1.2.1
Specialize workers
1.2.1.2.1.1
Increased aggression
1.2.1.2.1.2
Chemical defenses
1.2.1.2.1.2.1
Thicker cuticle
1.2.1.2.1.2.2
Longer/stronger mandibles
1.2.1.2.1.2.3
Increased body size
1.2.1.2.1.2.4
Physical adaptations
1.2.2
Inspect material entering
1.3
Prevent unauthorized entry into nest
1.3.1
Use defenses proportional to threat
1.3.1.1
Inspect more frequently if more infections present
1.3.1.1.1
Use danger dependent regulation


2
Identify sick agents properly
1.4
Prevent nest from being found
1.5
Prevent initial individual infection
2.1
Detect absence of self-structures
2.2.
Signal damage with endogenous alarms
2.3
Detect faulty behaviors
2.4
Prevent spoofing
2.5
Use colony odor
2.6
Use reliable self/not-self signal
1.4.1
Separate nests
1.4.2
Hide nests visually
1.4.3
Localize pheromone trails
1.5.1
Avoid areas with fungal spores/high risk areas
2.4.1
Require continued connections from individuals
2.4.2
Make unique
2.5.1
Deposit on midden pebbles
2.6.1
Prevent auto-immune issues
1.4.1.1
Use host patching
1.5.1.1
Create trails off jungle floor
2.4.1.1
Use changing signal
2.4.2.1
Depends on colony genetics
2.4.2.2
Diversify CHC signals
2.6.1.1
Don't overreact
1.5.1.1.1
Move across sticks
2.4.1.1.1
Use non ergodic signal
2.4.1.1.2
Use flexible template
2.4.1.1.3
Change in response to task assignment
2.4.1.1.4
Fluctuate in response to environment
2.4.2.1.1
Combine genetics of hydrocarbons
2.4.2.2.1
Different CHC on different parts of body


Prevent Epidemic
3
Use specialized workers
3.1
Use specialists as rovers
3.2
Use specialist to inspect incoming nest material
3.3
Use specialized workers for Allogrooming
4.1
Maintain beneficial genetic diversity
4.1.1
Ensure not too low to ensure survivors after attack/exposure
4.1.2
Ensure not too high to limit vulnerability to other vectors
4.1.1.1
Use poly Queen structure
4.2
Respond to invasion/infection
4.2.1
Reduce transmission rate
4.2.1.1
Maintain some ants idle
4.2.1.2
Change individual behaviors for sick individuals
4.2.1.3
Change group behaviors
4.2.1.2.1
Take actions to prevent spread
4.2.1.2.2
Warn others
4.2.1.3.1
Change contact rate
4.2.1.2.1.1
Become less responsive to social cues
4.2.1.2.1.2
Actively self-quarantine
4.2.1.2.1.3
Use social withdrawal
4.2.1.2.1.4
Seek environment to hasten death
4.2.1.2.2.1
Use pathogen alarm
4.2.1.3.1.1
Use asymmetric contract rates
4.2.2.1
Use appropriate response
4.2.2.1.1
Don't waste resources
4.2.2.1.2
Don't impact healthy agents with response
4.2.2.1.1.1
Don't overreact


4
Prevent growth inside the nest
4.3
Protect role of Queen
4.4
Protect Queen
4.2.2
Use efficient self/not-self recognition approach
4.2.3
Isolate parasites
4.2.4
Remove Infection
4.3.1
Prevent parasite population takeover
4.3.2
Prevent fertility signal from being mimicked
4.3.3
Prevent high jacking of fertility signal
4.4.1
Protect health
4.2.2.2
Change compromised recognition signals
4.2.2.3
Detect rapidly
4.2.3.1
Build prisons around them
4.2.4.1
Conduct allogrooming/out pasing infection
4.2.4.2
Use care-kill paradigm
4.3.1.1
Destroy parasite eggs
4.3.1.2
Outbreed social parasites
4.3.2.1
Increase complexity of signal
4.3.2.2
Use shifting fertility signal
4.3.3.1
Ensure workers only respond to Queen
4.4.1.1
Prevent transmission to Queen
4.4.1.2
Place Queen in secure location
4.4.1.3
Invest in Queen immune system
4.2.2.2.1
Diversify CHC if invasion occurs
4.2.4.1.1
Use specialized workers
4.3.1.1.1
Use rovers
4.3.3.1.1
Match pheromones with receptors
4.4.1.1.1
Ensure Queen caregivers care for queen exclusively
4.4.1.1.2
Ensure if worker is sick it changes tasks
4.4.1.2.1
Use centrifugal polytheism
4.4.1.2.2
Place in hard shell


5
Abandon nest
4.5
Enhance individual immune systems
4.6
Maintain clean nest
4.7
Create environment where parasite cannot propogate
4.5.1
Learn from other immune systems
4.5.2
Lower chance of infection
4.5.3
Remove pathogens from ants before infection roots
4.6.1
Prevent dead ants from infecting others
4.7.1
Control nest environment
4.7.2
Make nest chambers too small
4.5.1.1
Share antibodies
4.5.1.2
Expose healthy workers to weakened threat
4.5.1.3
Use beneficial network structure
4.5.2.1
Self medicate
4.5.3.1
Self groom
4.6.1.1
Have some workers specialize in allogrooming
4.6.1.2
Use disposal workers to interact with dead ants
4.6.1.3
Remove dead ants
4.7.1.1
Control Humidity
4.7.1.2
Control Temperature
4.5.1.1.1
Conduct Allogrooming
4.5.1.1.2
Conduct mutual feeding
4.5.2.1.1
Ingest natural anti-microbials
4.6.1.3.1
Destroy dead bodies
4.6.1.3.2
Carry outside of nest
4.7.1.1.1
Create nest structure
4.7.1.1.2
Use social fever