|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Dead/Vacant** | **Virulent** | **Hypovirulent** | **Healthy** |
| **Dead/Vacant** | 1- birth rate | 0 | 0 | Stage Matrix birth rate |
| **Virulent** | Stage Matrix | 1-hypo & death | Spread of hypovirus + treatment (.473) | 0 |
| **Hypovirulent** | Stage Matrix | Untreated- 0.162  Treated - .086 | 1-viru & death  (~.90 if treated) | 0 |
| **Healthy** | Stage Matrix | Spread of virus from virulent tree or hypovirulent tree | Spread of hypovirus | 1-hypo & viru & death |

Average horizontal transmission - .41

A hypovirulent produces ?? (~4 conidia). They spread 0.5 and take 50% of the time. 50% are infected with the hypovirus and 50% are not.

A virulent tree produces ~4 (determined by Poisson with mean of 4) ascrospores. They each spread ~2.5 (determined by negative exponential with mean of 2.5) spaces. And take 100% of the time 1.5/1.5

A virulent tree produces ?? (~4 conidia). They each spread about 0.5 cells and take 100% of the time.

We keep track of a tree’s virulence to determine spread!