Yeast mating facts

--haploids are stable, free living, metabolically identical to diploid
    two 'sexes', a and alpha

--sexual identity is determined by the 'MAT' locus, where MAT<u>a</u> encodes a single peptide
    (mat<u>a</u>1) while MAT alpha encodes mata1 and mata2.

--the products of the MAT locus are *transcriptional regulators*; they are not themselves part of the
    machineries discussed below. See handout for how these loci control cell sexual identity

--each sex secretes a small peptide hormone (pheromone) that is detected by the other.

--*Path out for <u>a</u>-factor: <u>a</u>-factor gene makes raw peptide, which then has a fatty group added
    (farnesyl group). This product is actively transported across the membrane.*

--*Path out for alpha factor: synthesized as a 4-unit polypeptide, it is cut into monomers by a
    protease, then diffuses through the membrane and out*

--alpha factor peptide is easily purified, stable, and commercially available

--*secretion genes and machinery are unique to each type; reception is common excepting only the
    first step, the membrane-spanning receptor; of course this is different to respond to the 2
    diff't pheromones*

--successful signal reception results in cell-cycle arrest at a defined point and transcription of
    genes required to bring about mating (fusion). The two haploids join completely to form a
    single diploid cell.

--the diploid cell 'knows' its ploidy because it contains both MAT<u>a</u> and MATa genes. If a diploid
    was MATt<u>a</u>/MAT<u>a</u> or MATa/MATa then it would behave entirely as a haploid.

--*the mating type locus is tightly linked to a recessive drug resistance locus encoding sensitivity to
    the drug cryptopleurine; this feature can be used to select mitotic recombinant <u>a</u>/<u>a</u> or a/a
    cells from <u>a</u>/a CRY^S/cry^{R}diploids. This is handy for complementation or dominance testing*

--haploids arise when diploids are exposed to special, nutrient-poor media. This induces **meiosis**
    and the production of 4 dormant spores.

--the 4 spores remain packaged together, thus all products of meiosis are recovered in a bundle.
    This is very useful for deducing the genotype of a given spore.

--spores can be teased apart ('dissected') and germinated by placing them on rich media

All these features are present in the simulation (those in italics are for YeastMate route)