#ifndef PARAMETER\_VALUES\_H

#define PARAMETER\_VALUES\_H

#include <array>

#include <bitset>

struct Cell\_params{

using reaction\_norm = std::array<double,2>;

constexpr static reaction\_norm init\_reprod{0.0,0.0};

constexpr static reaction\_norm init\_repair{0.0,0.0};

// proportion resources for foraging: 1-reprod-repair

constexpr static reaction\_norm init\_harvest{1.0,1.0}; // (relative) effort into harvesting foraged resources

constexpr static reaction\_norm init\_damalloc{0.0,0.0}; // damage equally distributed at first

constexpr static std::array<reaction\_norm,4> g\_init{init\_reprod,init\_repair,init\_harvest,init\_damalloc};

// mutations

constexpr static double mu{0.05};

constexpr static double mu\_v{0.001}; // viability loci 0->1

constexpr static double pr\_back{0.1}; // rel. prob 1->0: abs pr =mu\_v\*pr\_back

constexpr static double mu\_t{0}; // for damage transmission locus

constexpr static double sd\_mu{0.5};

constexpr static double mu\_h{0.01}; // for harvest (division of resources between cells)

// forage parameters

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// forage parameters

constexpr static double forage\_max{6.0};

constexpr static double q\_f{0.3}; // half-max

constexpr static bool type\_2{true}; // else (partially) convex type III

// repro params

// rate at which Pr(repro) approaches 1 with amount of resources 1-exp(-b\*res)

constexpr static double b\_r{0.1};

// mortality parameters

// adult cell mortality = c\*(d/d0)+(1-c)\*(d/d0)^4

constexpr static double d0a{1000.0};

constexpr static double c{0.2};

// adult mortality when solitary for a bit:

constexpr static double m0{1.0};

// delta damage (lambda of exponential distribution; mean=1/dd)

constexpr static double dd{2.0};

// damage repair rate constant

constexpr static double b\_re{0.5};

// nr of bi-allelic loci

constexpr static unsigned n\_v\_loci{16};

constexpr static std::bitset<n\_v\_loci> null\_v\_genotype = 0;

// extra mort round 1-exp(-b\_svg\*I(1))

constexpr static double b\_svg{0.05}; // here

// max damage to which max-damage allele corresponds

constexpr static double d\_max{6.0};

};

struct Pop\_params{

constexpr static unsigned long size{1000000};

// cell resources in generation 0

constexpr static double init\_resources{3.0};

};

// nr of traits to calc stats for

constexpr static unsigned n\_traits{45};

constexpr static unsigned long n\_timesteps{5000};

constexpr static unsigned skip{10};

#endif // PARAMETER\_VALUES\_H