The document is for explaining the parameter of the tree growth model.

#pragma region Parameters

/\*\*

\* **\brief** How many lateral bud will a internode generate. Larger value means more branching.

\*/

int m\_lateralBudPerNode = 2;



Figure 1: 1 vs 2

#pragma region Geometric

/\*\*

\* **\brief** The average of apical angle. Smaller value means straighter branches.

\*/

float m\_apicalAngleMean = 15.0f;

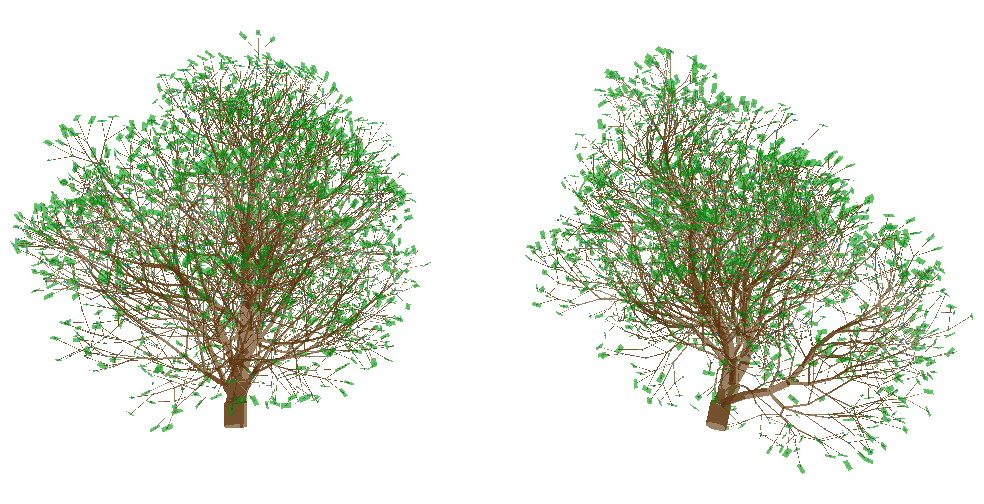


Figure 2: 5 vs 20

/\*\*

\* **\brief** The variance of apical angle.

\*/

float m\_apicalAngleVariance = 1.0f;

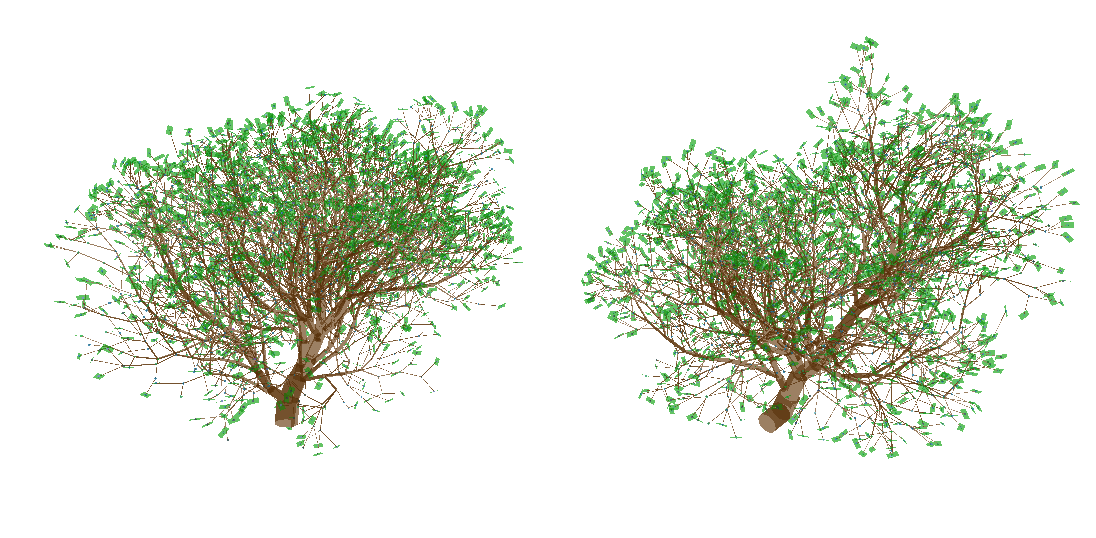


Figure 3: 1 vs 5

/\*\*

\* **\brief** The average of branching angle.

\*/

float m\_branchingAngleMean = 30;

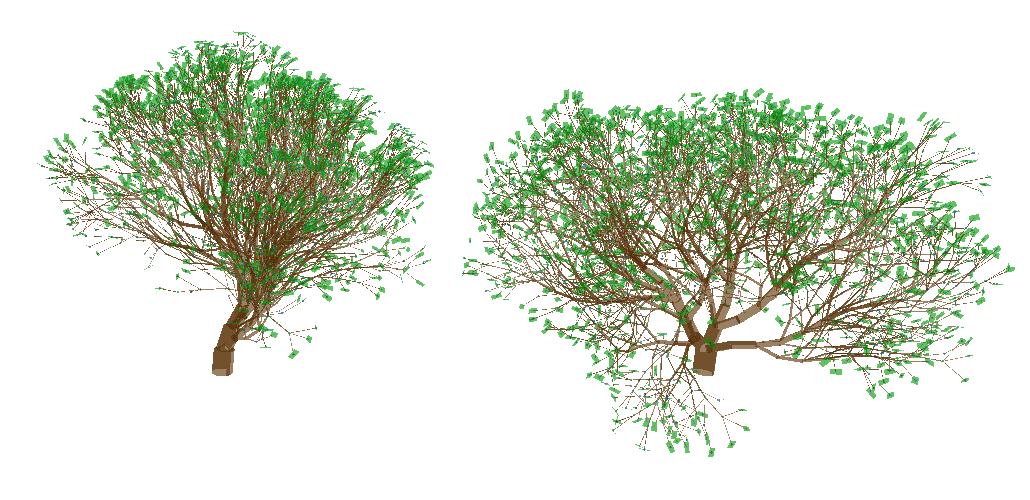


Figure 4: 15 vs 30

/\*\*

\* **\brief** The variance of branching angle.

\*/

float m\_branchingAngleVariance = 2;

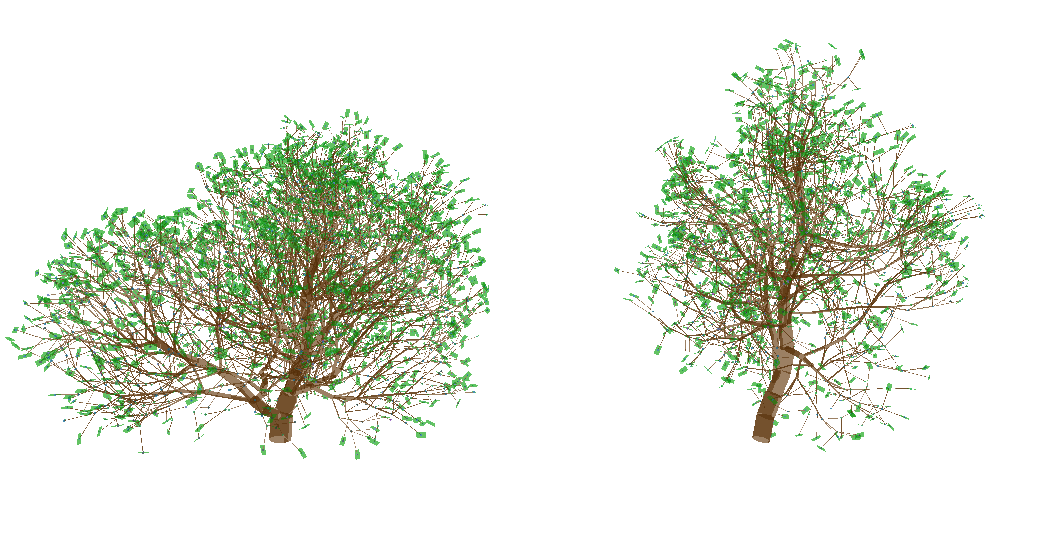


Figure 5: 2 vs 8

/\*\*

\* **\brief** The average of roll angle.

\*/

float m\_rollAngleMean = 60;



Figure 6: 30 vs 75

/\*\*

\* **\brief** The variance of roll angle.

\*/

float m\_rollAngleVariance = 1;

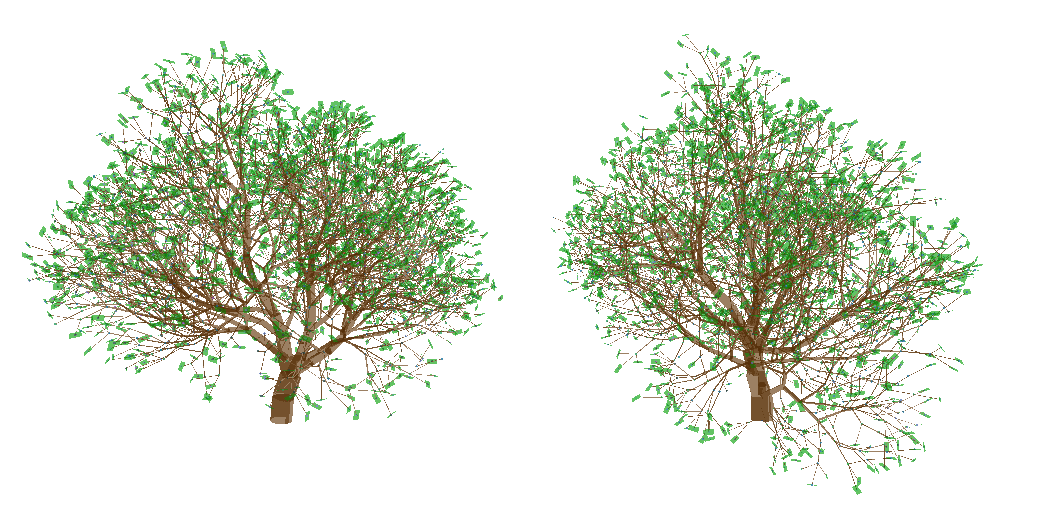


Figure 7: 1 vs 8

/\*\*

\* **\brief** The distance between two nearest internodes. Only illumination estimation is related to this.

\*/

float m\_internodeLengthBase = 1;



Figure 8: 0.5 vs 1.0

#pragma endregion

#pragma region Bud fate

/\*\*

\* **\brief** How much carbon does an apical bud needs to flush. Larger value makes apical bud flush

\* sooner.

\*/

float m\_apicalIlluminationRequirement = 1;



Figure 9: 1 vs 3

/\*\*

\* **\brief** How much carbon does a lateral bud needs to flush. Larger value makes lateral bud flush

\* sooner.

\*/

float m\_lateralIlluminationRequirement = 1;



Figure 10: 1 vs 3

/\*\*

\* **\brief** How much inhibitor will an internode generate. Inhibitor prohibits parent branches from

\* flushing. Here the inhibitor will reduce resource allocated to parent branches.

\*/

float m\_inhibitorBase = 0.9f;

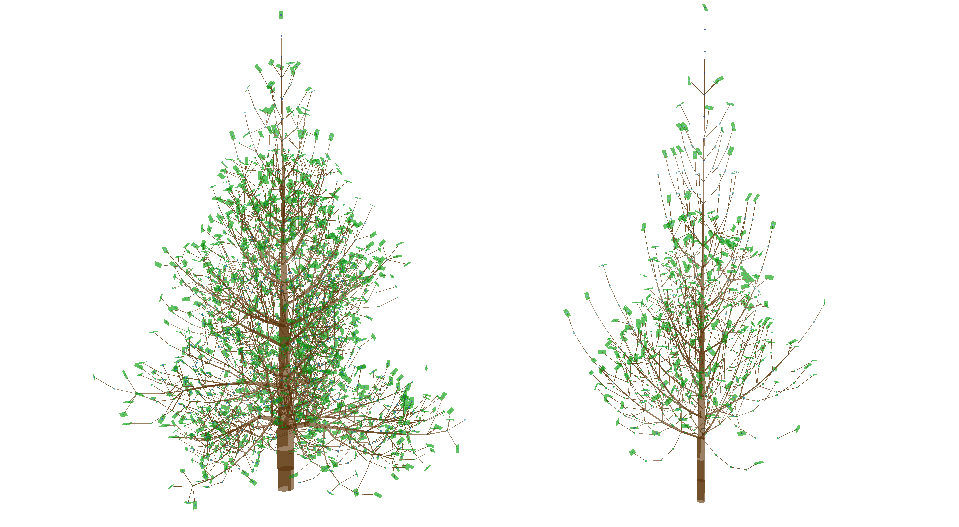


Figure 11: 0.3 vs 1.0

/\*\*

\* **\brief** How much inhibitor will be preserved when being transited to parent internodes.

\*/

float m\_inhibitorDistanceFactor = 0.8f;



Figure 12: 0.1 vs 0.7

/\*\*

\* **\brief** How much resource will an apical bud receive compare with lateral buds from resource allocation.

\*/

float m\_resourceWeightApical = 1.0f;

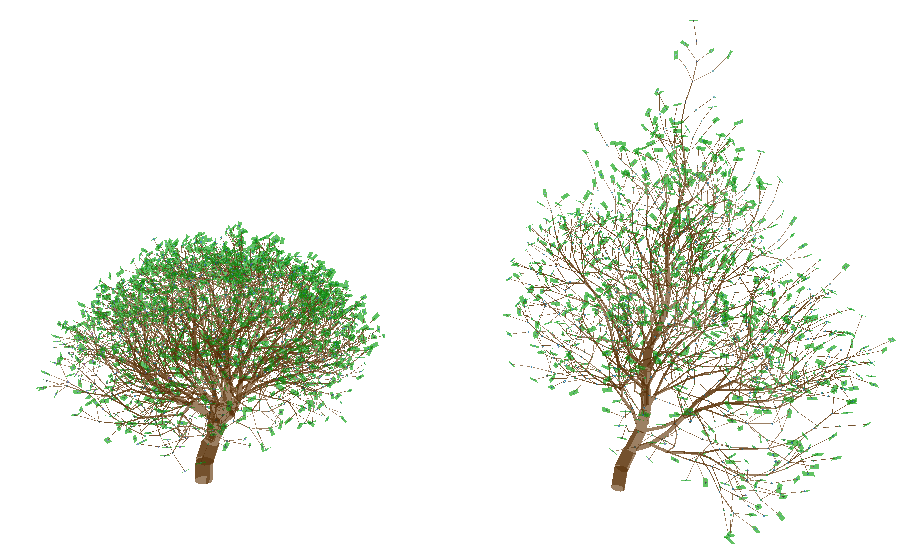


Figure 13: 1.0 vs 1.5

/\*\*

\* **\brief** The variance of weight between apical and lateral buds for resource allocation. Larger value

\* cause more irregular growth.

\*/

float m\_resourceWeightVariance = 0.0f;

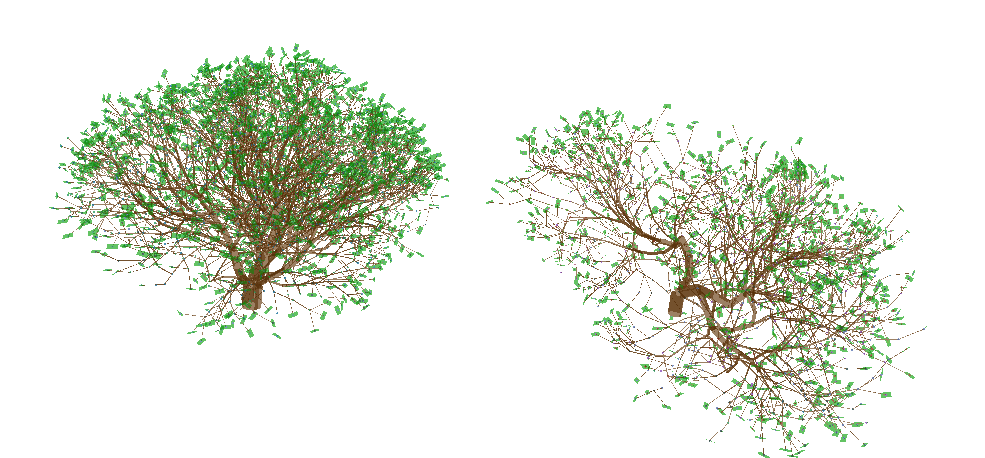


Figure 14: 0.0 vs 0.5

/\*\*

\* **\brief** How much will the resource allocation favor to main child. (Child with higher level)

\*/

float m\_apicalControlLevelFactor = 0.9f;

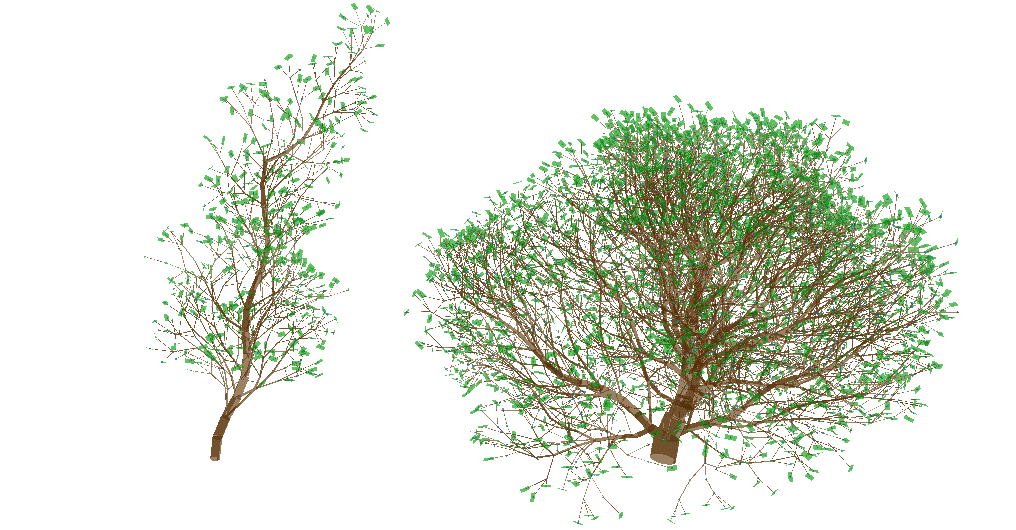


Figure 15: 0.3 vs 0.9

/\*\*

\* **\brief** The minimum resource for a plant will grow.

\*/

float m\_heightResourceHeightDecreaseMin = 0.01f;

/\*\*

\* **\brief** How resource decrease as tree grow higher.

\*/

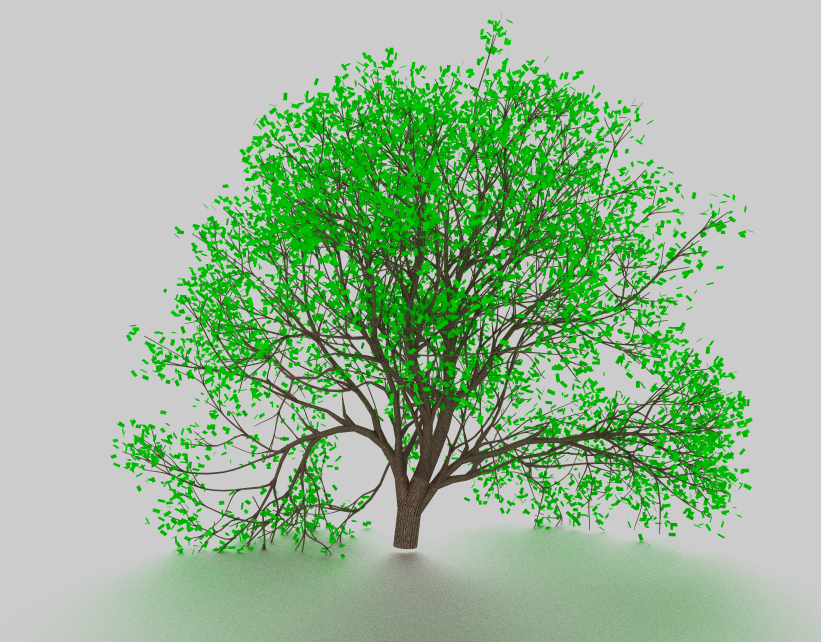
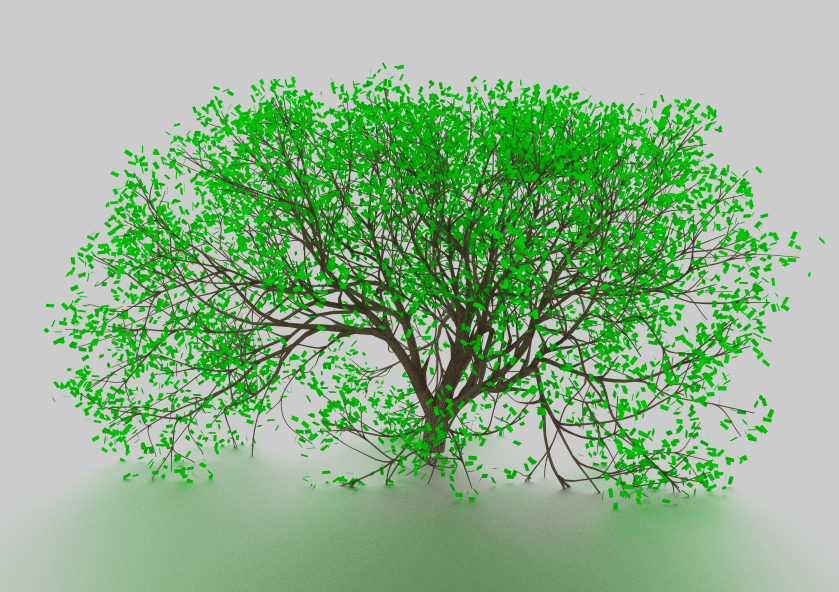
float m\_heightResourceHeightDecreaseBase = 0.0f;

/\*\*

\* **\brief** The speed of how resource decrease as tree grow higher.

\*/

float m\_heightResourceHeightDecreaseFactor = 1.0f;



#pragma endregion

#pragma region Environmental

/\*\*

\* **\brief** The avoidance angle to prevent self-collision for close branches.

\*/

float m\_avoidanceAngle = 10.0f;

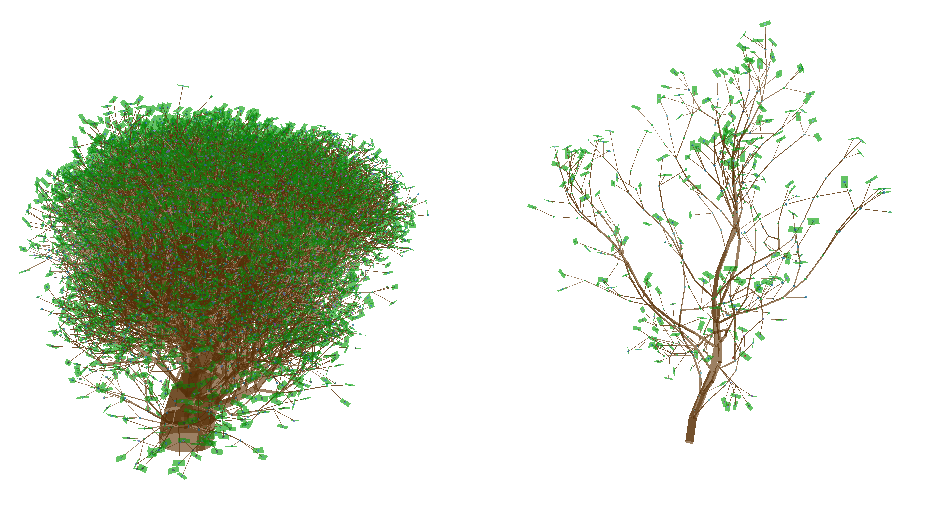


Figure 16: 1 vs 30

/\*\*

\* **\brief** How much will an internode rotate towards/against the light direction.

\*/

float m\_phototropism = 0.0f;

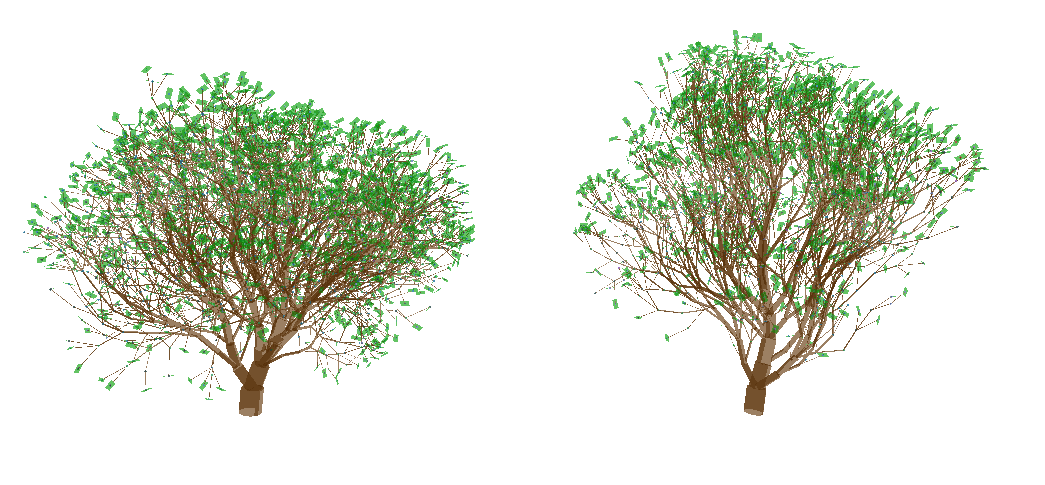


Figure 17: 0.01 vs 0.2

/\*\*

\* **\brief** How much will an internode rotate towards/against the direction of gravity.

\*/

float m\_gravitropism = 0.1f;

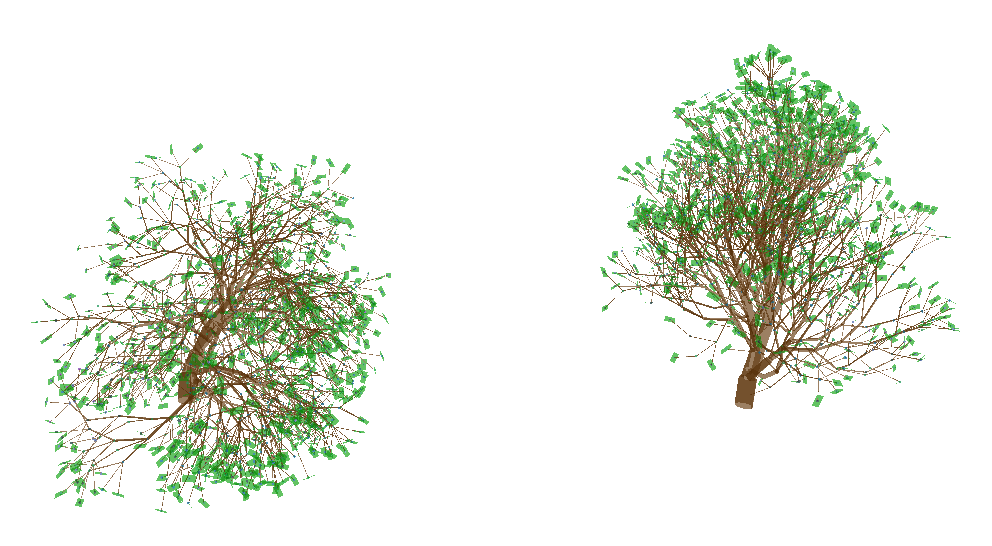


Figure 18: -0.2 vs 0.2

/\*\*

\* **\brief** The base probability of an end internode being cut off due to unknown environmental factors.

\*/

float m\_randomCutOff = -0.02f;

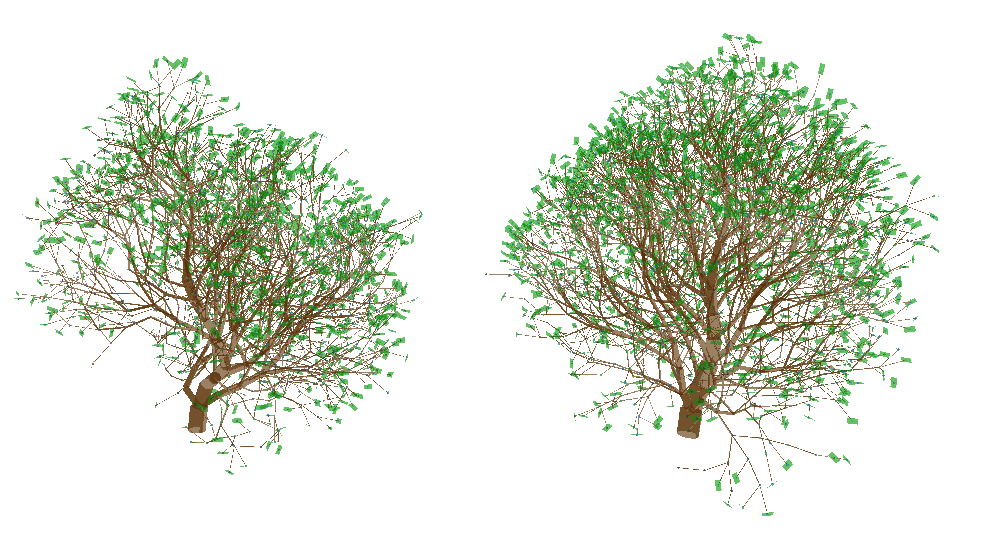


Figure 19: -0.02 vs -0.2

/\*\*

\* **\brief** How much the probability of an end internode being cut off due to unknown environmental factors will increase due to internode aging.

\*/

float m\_randomCutOffAgeFactor = 0.002f;



Figure 20: 0.05 vs 0.12

/\*\*

\* **\brief** The maximum probability of an end internode being cut off due to unknown environmental factors will increase due to internode aging.

\*/

float m\_randomCutOffMax = 0.03f;



Figure 21: 0.05 vs 0.2

/\*\*

\* **\brief** The limit of lateral branches being cut off when too close to the root.

\*/

float m\_lowBranchCutOff = 0.1f;

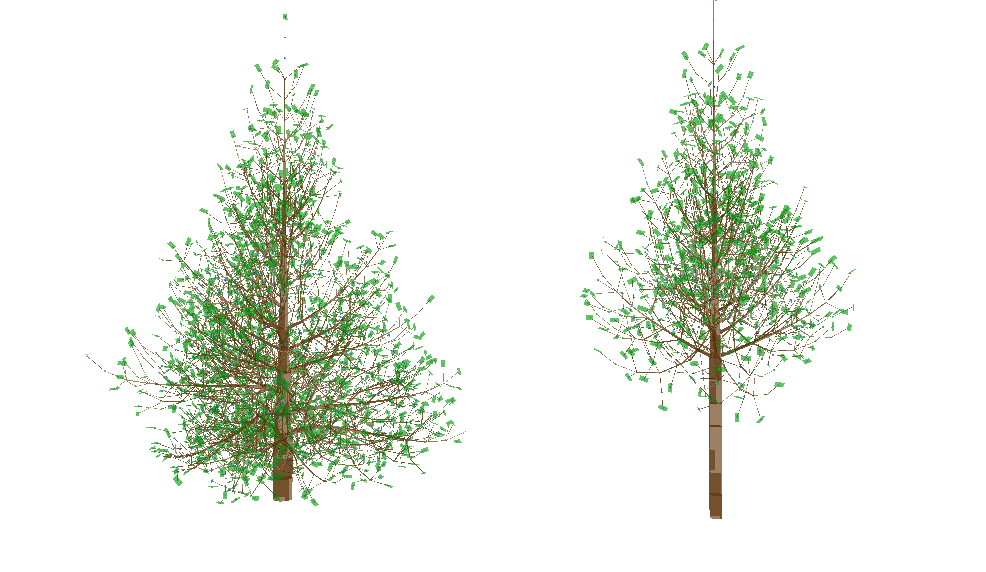


Figure 22: 0.15 vs 0.3

#pragma endregion

/\*\*

\* **\brief** The thickness of the end node.

\*/

float m\_endNodeThickness = 0.01f;

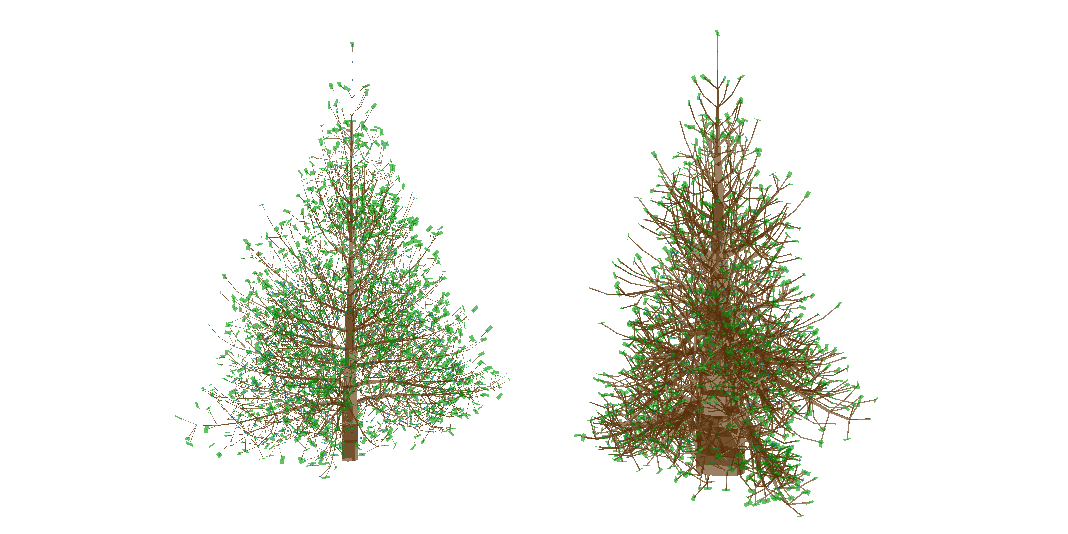


Figure 23: 0.01 vs 0.03

/\*\*

\* **\brief** The control factor thickness for thickness calculation.

\*/

float m\_thicknessControlFactor = 1.0f;

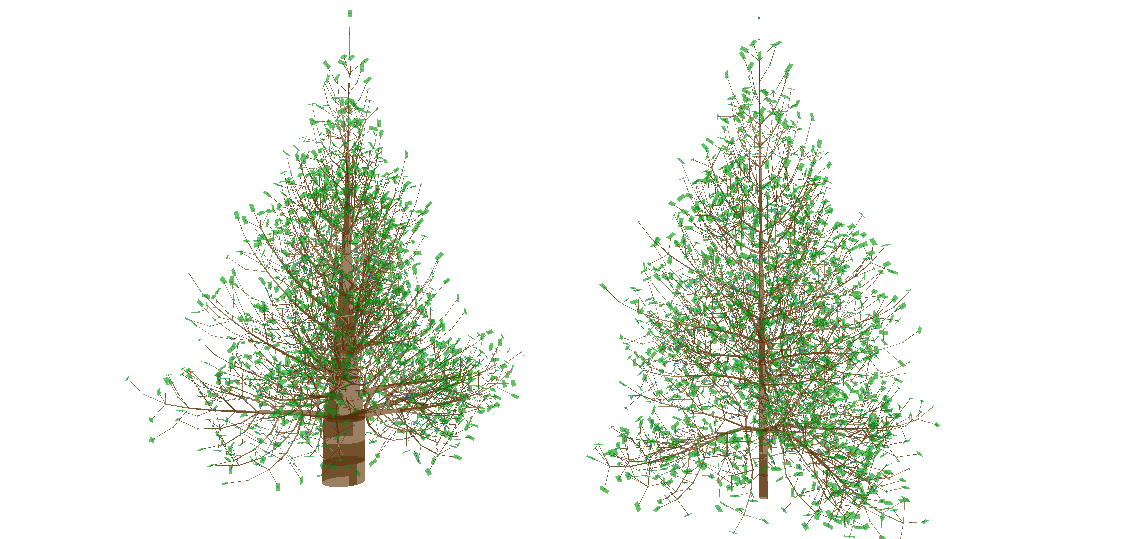


Figure 24: 1.1 vs 0.9

/\*\*

\* **\brief** The strength of gravity bending.

\*/

float m\_gravityBendingFactor = 0.8f;

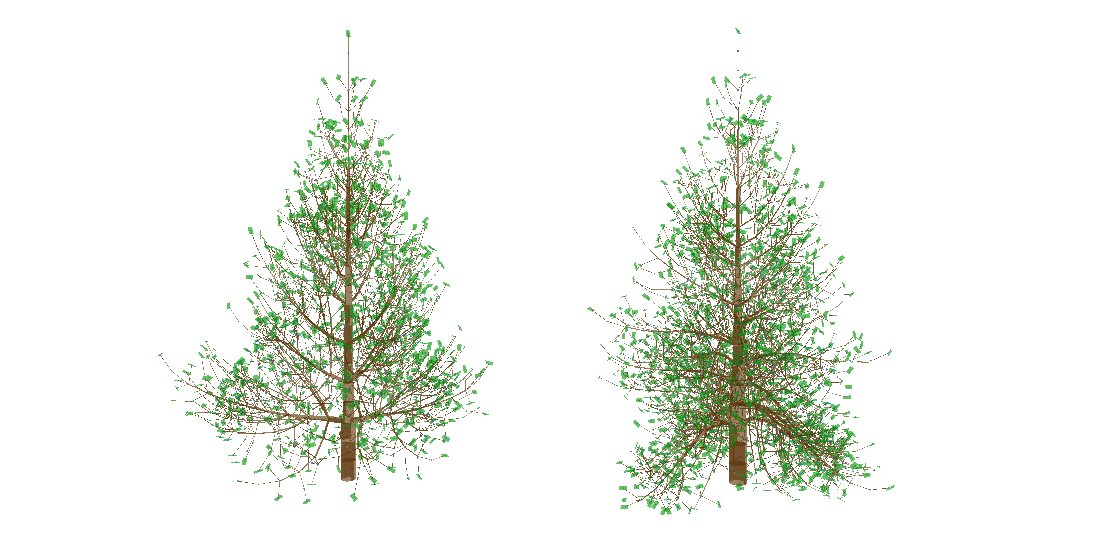


Figure 25: 2.5 vs 8.0

/\*\*

\* **\brief** The strength of a branch fight against gravity bending with its thickness.

\*/

float m\_gravityBendingThicknessFactor = 1.75f;

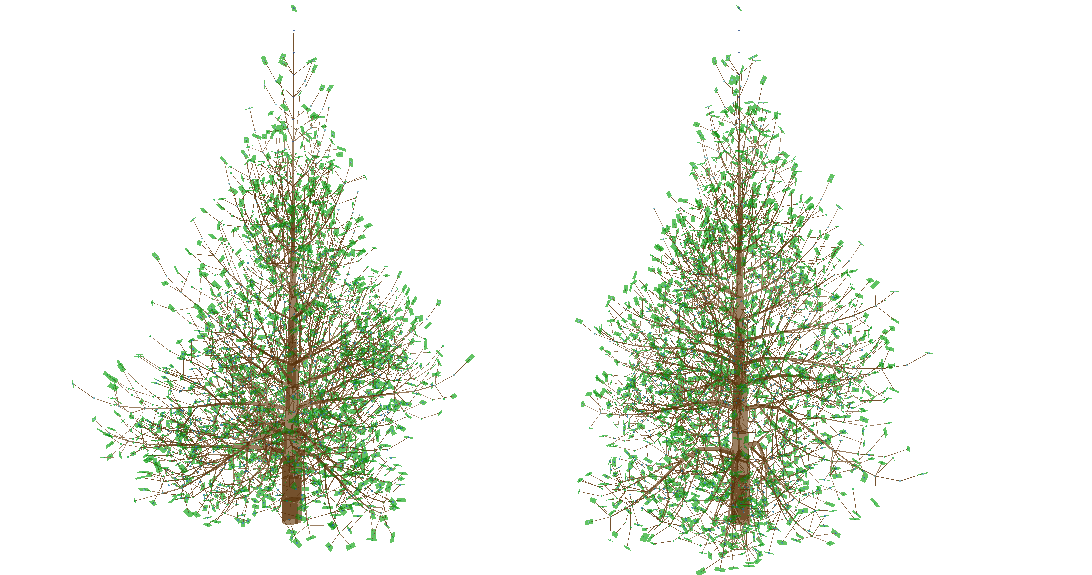


Figure 26: 0.7 vs 1.0

/\*\*

\* **\brief** The maximum bending strength of an internode.

\*/

float m\_gravityBendingMax = 1.0f;

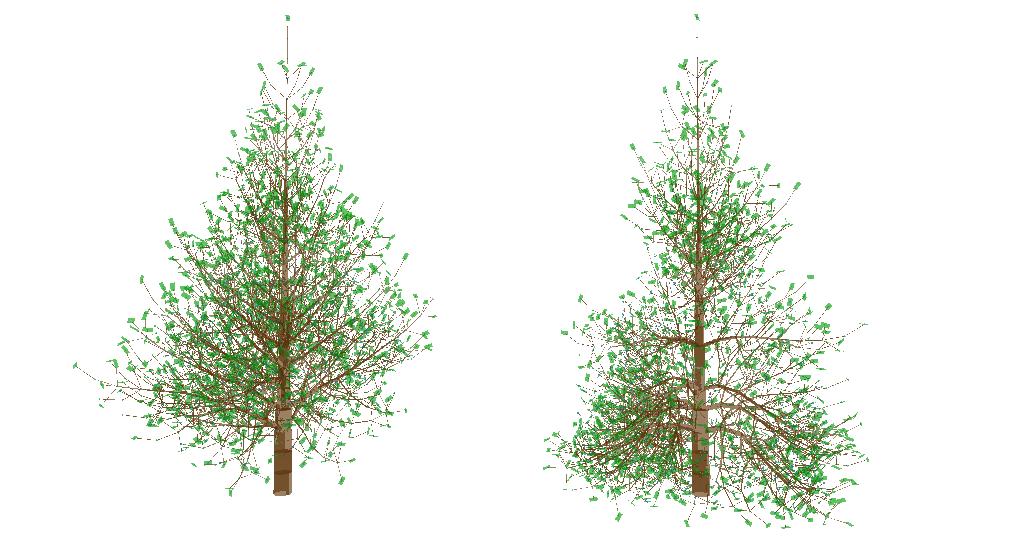


Figure 27: 0.5 vs 2.0

#pragma region Organs

/\*\*

\* **\brief** The type of this tree. May affect leaf pattern.

\*/

int m\_treeType = 0;

#pragma endregion

#pragma endregion