# Appendix 1.1 Crop/grass parameters (crop.100)

These crop.100 parameters are read for the initial crop/grass specified in the schedule file header, and for each subsequent crop/grass introduced in the schedule file with a CROP event.

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| PRDX(1) | Coefficient for calculating total monthly potential production as a function of solar radiation outside the atmosphere. It functions as a radiation use efficiency scalar on potential production. It reflects the relative genetic potential of the plant; larger PRDX(1) values indicate greater growth potential. | scaling factor,  (gC production)  \*m‑2  \*month‑1  \*Langley‑1 | 0.1 – 5.0 |
| PPDF(1) | Optimum temperature for production for parameterization of a Poisson Density Function curve to simulate temperature effect on growth. | °C | 10.0 – 40.0 |
| PPDF(2) | Maximum temperature for production for parameterization of a Poisson Density Function curve to simulate temperature effect on growth. | °C | 20.0 – 50.0 |
| PPDF(3) | Right curve shape for parameterization of a Poisson Density Function curve to simulate temperature effect on growth. |  | 0.0 – 1.0 |
| PPDF(4) | Right curve shape for parameterization of a Poisson Density Function curve to simulate temperature effect on growth. |  | 0.0 – 10.0 |
| BIOFLG | Flag indicating whether production should be reduced by physical obstruction; 0=production should not be reduced; 1=production should be reduced. | index | 0, 1 |
| BIOK5 | Level of aboveground standing dead + 10% strucc(1) C at which production is reduced to half maximum due to physical obstruction by dead material. Used only when ***BIOFLAG*** = 1. | g C m-2 | 0.0 – 2000.0 |
| PLTMRF | Planting month reduction factor to limit seedling growth; set to 1.0 for grass. | fraction | 0.0 – 1.0 |
| FULCAN | Value of above ground live C (aglivc) at full canopy cover, above which potential production is not reduced. (Above which there is no restriction on seedling growth). | g C m-2 | 50.0 – 200.0 |
| FRTCINDX | **0** - use Great Plains equation to compute root to shoot ratio (fixed carbon allocation based on rainfall, perennial plant); **1** - perennial plant; **2** - annual plant; **3** - perennial plant, growing degree day; **4** - non-grain filling annual plant, growing degree day implementation; **5** - grain filling annual plant, growing degree day implementation; **6** - grain filling annual plant that requires a vernalization period (i.e. winter wheat), growing degree day implementation | index | 0, 1, 2, 3, 4, 5, 6 |
| FRTC(1) | Fraction of C allocated to roots at planting, with no water or nutrient stress, used when FRTCINDX = 2, 4, 5, or 6. | fraction | 0.0 – 1.0 |
| FRTC(2) | Fraction of C allocated to roots at time FRTC(3), with no water or nutrient stress, used when FRTCINDX = 2, 4, 5, or 6. | fraction | 0.0 – 1.0 |
| FRTC(3) | Time after planting (days with soil temperature greater than RTDTMP) at which the FRTC(2) value is reached, used when FRTCINDX = 2, 4, 5, or 6. | number of days |  |
| FRTC(4) | Maximum increase in the fraction of C going to the roots due to water stress, used when FRTCINDX = 2, 4, 5, or 6. | fraction | 0.0 – 1.0 |
| FRTC(5) | Maximum increase in the fraction of C going to the roots due to nutrient stress, used when FRTCINDX = 2, 4, 5, or 6. | fraction | 0.0 – 1.0 |
| CFRTCN(1) | Maximum fraction of C allocated to roots under maximum nutrient stress, used when FRTCINDX = 1 or 3. | fraction | 0.0 – 1.0 |
| CFRTCN(2) | Minimum fraction of C allocated to roots with no nutrient stress, used when FRTCINDX = 1 or 3. | fraction | 0.0 – 1.0 |
| CFRTCW(1) | Maximum fraction of C allocated to roots under maximum water stress, used when FRTCINDX = 1 or 3. | fraction | 0.0 – 1.0 |
| CFRTCW(2) | Minimum fraction of C allocated to roots with no water stress, used when FRTCINDX = 1 or 3. | fraction | 0.0 – 1.0 |
| BIOMAX | Aboveground biomass level above which the minimum and maximum C/E ratios of new shoot increments equal PRAMN(\*,2) and PRAMX(\*,2) respectively. | g biomass m-2 | 0 – 1000 |
| PRAMN(1,1) | Minimum aboveground C/N ratio with zero biomass. | C/N ratio | 1.0 – 100.0 |
| PRAMN(2,1) | Minimum aboveground C/P ratio with zero biomass. | C/P ratio | 1.0 – 9999.0 |
| PRAMN(3,1) | Minimum aboveground C/S ratio with zero biomass. | C/S ratio | 1.0 – 9999.0 |
| PRAMN(1,2) | Minimum aboveground C/N ratio with biomass > BIOMAX. | C/N ratio | 1.0 – 200.0 |
| PRAMN(2,2) | Minimum aboveground C/P ratio with biomass > BIOMAX. | C/P ratio | 1.0 – 9999.0 |
| PRAMN(3,2) | Minimum aboveground C/S ratio with biomass > BIOMAX. | C/S ratio | 1.0 – 9999.0 |
| PRAMX(1,1) | Maximum aboveground C/N ratio with zero biomass. | C/N ratio | 1.0 – 200.0 |
| PRAMX(2,1) | Maximum aboveground C/P ratio with zero biomass. | C/P ratio | 1.0 – 9999.0 |
| PRAMX(3,1) | Maximum aboveground C/S ratio with zero biomass. | C/S ratio | 1.0 – 9999.0 |
| PRAMX(1,2) | Maximum aboveground C/N ratio with biomass > BIOMAX. | C/N ratio | 1.0 – 400.0 |
| PRAMX(2,2) | Maximum aboveground C/P ratio with biomass > BIOMAX. | C/P ratio | 1.0 – 9999.0 |
| PRAMX(3,2) | Maximum aboveground C/S ratio with biomass > BIOMAX. | C/S ratio | 1.0 – 9999.0 |
| PRBMN(1,1) | (N, intercept) parameter for computing minimum C/N ratio for belowground matter as a linear function of annual precipitation. | C/N ratio | 1.0 – 150.0 |
| PRBMN(2,1) | (P, intercept) parameter for computing minimum C/P ratio for belowground matter as a linear function of annual precipitation. | C/P ratio | 0.0 – 9999.0 |
| PRBMN(3,1) | (S, intercept) parameter for computing minimum C/S ratio for belowground matter as a linear function of annual precipitation. | C/S ratio | 0.0 – 9999.0 |
| PRBMN(1,2) | (N, slope) parameter for computing minimum C/N ratio for belowground matter as a linear function of annual precipitation. | change in C/N ratio per cm precipitation | 0.0 – 1.0 |
| PRBMN(2,2) | (P, slope) parameter for computing minimum C/P ratio for belowground matter as a linear function of annual precipitation. | change in C/P ratio per cm precipitation | 0.0 – 9999.0 |
| PRBMN(3,2) | (S, slope) parameter for computing minimum C/S ratio for belowground matter as a linear function of annual precipitation. | change in C/S ratio per cm precipitation | 0.0 – 9999.0 |
| PRBMX(1,1) | (N, intercept) parameter for computing maximum C/N ratio for belowground matter as a linear function of annual precipitation. | C/N ratio | 0.0 – 300.0 |
| PRBMX(2,1) | (P, intercept) parameter for computing maximum C/P ratio for belowground matter as a linear function of annual precipitation. | C/P ratio | 0.0 – 9999.0 |
| PRBMX(3,1) | (S, intercept) parameter for computing maximum C/S ratio for belowground matter as a linear function of annual precipitation. | C/S ratio | 0.0 – 9999.0 |
| PRBMX(1,2) | (N, slope) parameter for computing maximum C/N ratio for belowground matter as a linear function of annual precipitation. | change in C/N ratio per cm precipitation | 0.0 – 1.0 |
| PRBMX(2,2) | (P, slope) parameter for computing maximum C/P ratio for belowground matter as a linear function of annual precipitation. | change in C/P ratio per cm precipitation | 0.0 – 1.0 |
| PRBMX(3,2) | (S, slope) parameter for computing maximum C/S ratio for belowground matter as a linear function of annual precipitation. | change in C/S ratio per cm precipitation | 0.0 – 1.0 |
| FLIGNI(1,1) | Intercept for equation to predict lignin content fraction based on annual rainfall for aboveground material. | g lignin C / g C | 0.0 – 1.0 |
| FLIGNI(2,1) | Slope for equation to predict lignin content fraction based on annual rainfall for aboveground material. For crops, set to 0. | change in lignin fraction per cm precipitation | 0.0 – 1.0 |
| FLIGNI(1,2) | Intercept for equation to predict lignin content fraction based on annual rainfall for juvenile fine root material. | g lignin C / g C | 0.0 – 1.0 |
| FLIGNI(2,2) | Slope for equation to predict lignin content fraction based on annual rainfall for juvenile fine root material. For crops, set to 0. | change in lignin fraction per cm precipitation | 0.0 – 1.0 |
| FLIGNI(1,3) | Intercept for equation to predict lignin content fraction based on annual rainfall for mature live fine root material | g lignin C / g C | 0.0 – 1.0 |
| FLIGNI(2,3) | Slope for equation to predict lignin content fraction based on annual rainfall for mature live fine root material. For crops, set to 0. | change in lignin fraction per cm precipitation | 0.0 – 1.0 |
| HIMAX | Maximum harvest index maximum, the fraction of aboveground live C (aglivc) allocated to grain at the time of harvest. | fraction | 0.0 – 1.0 |
| HIWSF | Harvest index water stress factor: 0=no effect of water stress; 1= no grain yield with maximum water stress. | fraction | 0 – 1 |
| HIMON(1) | Number of months prior to harvest in which to begin accumulating water stress effect on harvest index. | number of months | 1 – 12 |
| HIMON(2) | Number of months prior to harvest in which to stop accumulating water stress effect on harvest index. | number of months | 1 – 12 |
| EFRGRN(1) | Fraction of above ground N which goes to grain. | fraction | 0.0 – 1.0 |
| EFRGRN(2) | Fraction of above ground P which goes to grain. | fraction | 0.0 – 1.0 |
| EFRGRN(3) | Fraction of above ground S which goes to grain. | fraction | 0.0 – 1.0 |
| VLOSSP | Fraction of above ground plant N which is volatilized (occurs during harvest and death). | fraction | 0.0 – 1.0 |
| FSDETH(1) | Maximum shoot death rate at very dry soil conditions (fraction/month); to get the monthly shoot death rate, this fraction is multiplied by a reduction factor depending on the soil water status. | fraction | 0.0 – 1.0 |
| FSDETH(2) | Fraction of shoots which die during senescence month; must be ≥ 0.4. | fraction | 0.4 – 1.0 |
| FSDETH(3) | Additional fraction of shoots which die when aboveground live C is greater than FSDETH(4). | fraction | 0.0 – 1.0 |
| FSDETH(4) | Level of aboveground C above which shading occurs and shoot senescence increases. | g C m-2 | 0.0 – 500.0 |
| FALLRT | Fall rate (fraction of standing dead which falls each month). | fraction | 0.0 – 1.0 |
| RDRJ | Maximum juvenile fine root death rate at very dry soil conditions (fraction/month); to get the monthly root death rate, this fraction is multiplied by a reduction fraction depending on the soil water status. | fraction | 0.0 – 1.0 |
| RDRM | Maximum mature fine root death rate at very dry soil conditions (fraction/month); to get the monthly root death rate, this fraction is multiplied by a reduction fraction depending on the soil water status. | fraction | 0.0 – 1.0 |
| RDSRFC | Fraction of the fine roots that are transferred into the surface litter layer (SRTUCC(1) and METABC(1)) upon root death, the remainder of the roots will go to the soil litter layer (STRUCC(2) and METABC(2)) | fraction | 0.0 – 1.0 |
| RTDTMP | This parameter is used to determine the number of days since planting (number of days where soil temperature >= rtdtmp). In turn, the number of days since planting is used to determine fine root allocation for annual plants. See FRTC(3). | °C | -5.0 – 5.0 |
| CRPRTF(1) | Fraction of N retranslocated from grass/crop leaves at death. | fraction | 0.0 – 1.0 |
| CRPRTF(2) | Fraction of P retranslocated from grass/crop leaves at death. | fraction | 0.0 – 1.0 |
| CRPRTF(3) | Fraction of S retranslocated from grass/crop leaves at death. | fraction | 0.0 – 1.0 |
| MRTFRAC | Fraction of fine root production that goes into mature roots. | fraction | 0.0 – 1.0 |
| SNFXMX(1) | Symbiotic N fixation maximum for grass/crop. | g N fixed/g C new growth | 0.0 – 1.0 |
| DEL13C | Delta 13C value for stable isotope labeling |  | -30.0 – 0.0 |
| CO2IPR(1) | In a grass/crop system, the effect on plant production ratio of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. |  | 0.5 – 1.5 |
| CO2ITR(1) | In a grass/crop system, the effect on transpiration rate of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. |  | 0.5 – 1.5 |
| **CO2ICE(1,\*,\*)** | **In a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm** |  |  |
| CO2ICE(1,1,1) | (1,1,1) = minimum C/N; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. | C/N ratio | 0.5 – 1.5 |
| CO2ICE(1,1,2) | (1,1,2) = minimum C/P; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. | C/P ratio | 0.5 – 1.5 |
| CO2ICE(1,1,3) | (1,1,3) = minimum C/S; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. | C/S ratio | 0.5 – 1.5 |
| CO2ICE(1,2,1) | (1,2,1) = maximum C/N; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. | C/N ratio | 0.5 – 1.5 |
| CO2ICE(1,2,2) | (1,2,2) = maximum C/P; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. | C/P ratio | 0.5 – 1.5 |
| CO2ICE(1,2,3) | (1,2,3) = maximum C/S; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. | C/S ratio | 0.5 – 1.5 |
| CO2IRS(1) | In a grass/crop system, the effect on root/shoot ratio of doubling the atmospheric CO2 concentration from 350 ppm to 700 ppm. |  | 0.5 – 1.5 |
| CKMRSPMX(1) | Maximum fraction of aboveground live C that goes to maintenance respiration for crops. | fraction | 0.0 – 1.0 |
| CKMRSPMX(2) | Maximum fraction of belowground juvenile root C that goes to maintenance respiration for crops. | fraction | 0.0 – 1.0 |
| CKMRSPMX(3) | Maximum fraction of belowground mature root C that goes to maintenance respiration for crops. | fraction | 0.0 – 1.0 |
| CMRSPNPP(1) | X1 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is less than (CMRSPNPP(3) \* predicted aboveground production) for a grass/crop system |  |  |
| CMRSPNPP(2) | Y1 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is less than (CMRSPNPP(3) \* predicted aboveground production) for a grass/crop system |  |  |
| CMRSPNPP(3) | X2 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is less than (CMRSPNPP(3) \* predicted aboveground production) for a grass/crop system -OR- X1 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is between (CMRSPNPP(3) \* predicted aboveground production) and (CMRSPNPP(5) \* predicted aboveground production) for a grass/crop system |  |  |
| CMRSPNPP(4) | Y2 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is less than (CMRSPNPP(3) \* predicted aboveground production) for a grass/crop system -OR- Y1 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is between (CMRSPNPP(3) \* predicted aboveground production) and (CMRSPNPP(5) \* predicted aboveground production) for a grass/crop system |  |  |
| CMRSPNPP(5) | X2 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is between (CMRSPNPP(3) \* predicted aboveground production)and (CMRSPNPP(5) \* predicted aboveground production) for a grass/crop system |  |  |
| CMRSPNPP(6) | Y2 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is between (CMRSPNPP(3) \* predicted aboveground production) and (CMRSPNPP(5) \* predicted aboveground production) for a grass/crop system -OR- Y value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is greater than (CMRSPNPP(5)\*predicted aboveground production) for a grass/crop system |  |  |
| CGRESP(1) | Maximum fraction of aboveground live C that goes to growth respiration for crops. | fraction | 0.0 – 1.0 |
| CGRESP(2) | Maximum fraction of juvenile fine root live C that goes to growth respiration for crops. | fraction | 0.0 – 1.0 |
| CGRESP(3) | Maximum fraction of mature fine root live C that goes to growth respiration for crops. | fraction | 0.0 – 1.0 |
| NO3PREF(1) | Nitrate preference. When both ammonium and nitrate are present, this is the fraction of N uptake that will come from nitrate (if possible). When this value is negative, ammonium and nitrate will be taken up in proportion to the amount available, which is the way DayCent has traditionally computed N uptake. | fraction | -1 or  0.0 – 1.0 |
| CLAYPG | Number of soil layers that crop roots can occupy. The value used as CLAYPG for annual plants will vary from 1 on the day that plant growth starts to CLAYPG as read from the CROP option on day FRTC(3) of plant growth | number of soil layers | 1 - 9 |
| CMIX | Annual rate of mixing of surface SOM2C and soil SOM2C for grass/crop system, this value will also be used when running a savanna. | yr-1 | 0.0 – 1.0 |
| DDEMERGE | Number of growing degree days that need to accumulate after the PLTM event in order for plant emergence to occur when FRTCINDX = 4, 5, or 6. | number of degree days |  |
| DDBASE | Number of degree days required to trigger a senescence (SENM) event for a perennial (FRTCINDX = 3), maturity and harvest (HARV) for a non-grain filling annual (FRTCINDX = 4), or to reach anthesis (flowering) for a grain filling annual (FRTCINDX = 5 or 6). | number of degree days |  |
| TMPKILL | Temperature at which growth will stop when using the growing degree day submodel, will cause a SENM and LAST event when FRTCINDX = 3 or a HARV and LAST event if FRTCINDX = 4, 5, or 6, if the required number of thermal units have not been accumulated prior to trigger a SENM or a HARV event. | °C |  |
| BASETEMP(1) | Base temperature for crop growth, growing degree days will accumulate only on days when the average temperature (a weighted average of the minimum and maximum daily temperature) is greater than the base temperature for the crop. | °C |  |
| BASETEMP(2) | Ceiling on the maximum temperature used to compute the average temperature (a weighted average of the minimum and maximum daily temperature) for the growing degree day accumulation. | °C |  |
| MNDDHRV | Minimum number of degree days from anthesis (flowering) to harvest for grain filling annuals (FRTCINDX = 5 or 6) when there is full water stress. | number of degree days (°C) |  |
| MXDDHRV | Maximum number of degree days from anthesis (flowering) to harvest for grain filling annuals (FRTCINDX = 5 or 6) (no water stress). | number of degree days (°C) |  |
| CURGDYS | Number of days of unrestricted growth in a grass/crop system. | number of days |  |
| CLSGRES | Grass/crop late season growth restriction factor. |  | 0.0 – 1.0 |
| CMXTURN | Maximum turnover rate per month of juvenile fine roots to mature fine roots through aging | fraction | 0.0 – 1.0 |
| WSCOEFF(1,1) | Water Stress Coefficient used to calculate the water stress multiplier on potential growth based on the relative water content of the wettest soil layer in the rooting zone (*maxrwcf, 0-1*). | See wscoeff.xlsx | 0.2 – 0.5 |
| WSCOEFF(1,2) | Water Stress Coefficient used to calculate the water stress multiplier on potential growth based on the relative water content of the wettest soil layer in the rooting zone. See comments above. | See wscoeff.xlsx | 6.0 – 30.0 |
| PS2MRSP(1) | Fraction of photosynthesis that goes to maintenance respiration. | fraction | 0.0 – 1.0 |
| CRPINDX | Flag to indicate the root priming effect to be simulated:  0 = no root priming  1 = total soil respiration (heterotrophic plus autotrophic)  2 = heterotrophic soil respiration only  3 = fine root production |  |  |
| CRPCMN | Minimum respiration or root production required for minimum effect on root priming. | g C m-2 day-1 |  |
| CRPCMX | Maximum respiration or root production required for maximum effect on root priming. | g C m-2 day-1 |  |
| CRPMNMUL | Multiplier for root priming effect on som2c(2) decomposition when respiration or root production equals the minimum value (CRPCMN) | multiplier |  |
| CRPMXMUL | Multiplier for root priming effect on som2c(2) decomposition when respiration or root production equals the maximum value (CRPCMX) | multiplier |  |
| AMAX(1) | Maximum net CO2 assimilation rate assuming maximum possible PAR, all intercepted, no temperature, water or vapor pressure deficit stress. | nmol CO2 g-1 (leaf biomass) sec-1 |  |
| AMAXFRAC(1) | Average daily maximum photosynthesis as a fraction of AMAX(1). | fraction | 0.0 – 1.0 |
| AMAXSCALAR1(1) | Multiplier used to adjust aMax based on growthDays1 days since germination. | scalar |  |
| AMAXSCALAR2(1) | Multiplier used to adjust aMax based on growthDays2 days since germination. | scalar | 0.8 – 1.6 |
| AMAXSCALAR3(1) | Multiplier used to adjust aMax based on growthDays3 days since germination. | scalar | 0.7 – 1.5 |
| AMAXSCALAR4(1) | Multiplier used to adjust aMax based on growthDays4 days since germination. | scalar | 0.3 – 0.8 |
| ATTENUATION(1) | Light attenuation coefficient. |  |  |
| BASEFOLRESPFRAC(1) | Basal foliage respiration rate, as percentage of maximum net photosynthesis rate. |  |  |
| CFRACLEAF(1) | Factor for converting leaf biomass to carbon (leaf biomass \* cFracLeaf = leaf carbon). | g C / g biomass |  |
| DVPDEXP(1) | Exponential value in vapor pressure deficit effect on photosynthesis equation.  dVpd = dVpdSlope \* exp(vpd\*dVpdExp) |  |  |
| DVPDSLOPE(1) | Slope value in vapor pressure deficit effect on photosynthesis equation.  dVpd = dVpdSlope \* exp(vpd\*dVpdExp) |  |  |
| GROWTHDAYS1(1) | Number of days after germination to start using AMAXSCALAR1. | number of days |  |
| GROWTHDAYS2(1) | Number of days after germination to start using AMAXSCALAR2. | number of days |  |
| GROWTHDAYS3(1) | Number of days after germination to start using AMAXSCALAR3. | number of days |  |
| GROWTHDAYS4(1) | Number of days after germination to start using AMAXSCALAR4. | number of days |  |
| HALFSATPAR(1) | Photosynthetically active radiation (PAR) at which photosynthesis occurs at 1/2 of theoretical maximum. | Einsteins \* m-2 ground area \* day-1 |  |
| LEAFCSPWT(1) | Grams of carbon in a square meter of leaf area. | g C m-2 leaf area |  |
| PSNTMIN(1) | Minimum temperature at which net photosynthesis occurs. | °C |  |
| PSNTOPT(1) | Optimal temperature at which net photosynthesis occurs. | °C |  |
| LUXEUPF(1) | Fraction of N luxury uptake. The additional amount, defined as the fraction of regular plant soil inorganic N uptake, that will be transferred from mineral soil N to internal N storage (crpstg(1)) when the number of days in the growing season < CSTGDYS. Luxury N uptake + plant soil N uptake cannot exceed the amount of mineral soil N available, nor can it reduce the C:N of above ground live biomass to a value < PRAMN(1,1). Used only when FRTCINDX = 2, 4, 5, or 6 (annual plants). | fraction per day | 0.0 – 1.0 |
| LUXEUPF(2) | Fraction of P luxury uptake. Same as LUXEUPF(1) expect for P instead. This parameter is a placeholder – currently luxury uptake only works for N. | fraction per day | 0.0 – 1.0 |
| LUXEUPF(3) | Fraction of S luxury uptake. Same as LUXEUPF(1) expect for S instead. This parameter is a placeholder – currently luxury uptake only works for N. | fraction per day | 0.0 – 1.0 |
| CSTGEUPF(1) | Fraction of internal N storage (crpstg(1)) that can be used by plants that have been doing luxury N uptake (luxury N uptake occurs when LUXEUPF(1) > 0). This fraction is used when the number of days in the growing season > CSTGDYS or when there is some N limitation to plant growth (when crop\_a2drat < CSTA2DRAT). (When crop\_a2drat ≥ CSGA2DRAT AND growing season days < CSTGDYS, there is no uptake from crpstg(1)). Used only when FRTCINDX = 2, 4, 5, or 6 (annual plants). | fraction per day | 0.0 – 1.0 (or greater) |
| CSTGEUPF(2) | Fraction of internal P storage (crpstg(2)) that can be used by plants when doing luxury P uptake (when LUXEUPF(2) > 0). This parameter is a placeholder – currently luxury uptake only works for N. | fraction per day | 0.0 – 1.0 (or greater) |
| CSTGEUPF(3) | Fraction of internal S storage (crpstg(3)) that can be used by plants when doing luxury S uptake (when LUXEUPF(3) > 0). This parameter is a placeholder – currently luxury uptake only works for N. | fraction per day | 0.0 – 1.0 (or greater) |
| CSTGDYS | When there is luxury E uptake (when LUXEUPF(\*) > 0), this is the maximum number of days after germination that a crop has to wait to start using internal E storage (crpstg(\*)) to fulfill nutrient demand. For nutrient poor conditions, determined by the ratio of mineral N available to plants to the supply of mineral N (crop\_a2drat), the crop can start using crpstg)\*) earlier when the nutrient demand cannot be met by soil supply (when crop\_a2drat < CSTGA2DRAT). Used when only FRTCINDX = 2, 4, 5, or 6 (annual plants). Perennial plants can use crpstg(\*) at any time, and use that resource up before taking up N from other sources. | number of days | 0 – number of days in the growing season |
| CSTGA2DRAT | When there is luxury E uptake (when LUXEUPF(\*) > 0.0), this is the ratio of mineral E available to the plant mineral E demand (crop\_a2drat) that determines if internal E storage (crpstg(\*)) can be used when the number of days in the growing season < CSTGDYS. When crop\_a2drat < CSTGA2DRAT and growing days < CSTGDYS, crops can take up a fraction (CSTGEUPF(1)) of crpstg(\*). When crop\_a2drat ≥ CSTGA2DRAT and growing days < CSTGDYS, there is no uptake from crpstg(\*). This parameter is not used when growing days > CSTGDYS. | ratio | 0.0 – 1.0 or greater |
| FLODEFF(1) | Multiplier on potential crop production when soil in the rooting zone is saturated. The flood effect on potential production is 1.0 at field capacity (or drier) and is decreased/increased linearly as soil in the rooting zone becomes wetter. A value of 1.0 = no effect of flooding on potential production. To decrease potential production when soils are saturated, use a value < 1.0. FLODEFF(1)=0.0 ceases production when soils are saturated. To increase potential production when soils are saturated, use a value > 1.0. | fraction | 1. – 1.0   or  1.0 – 2.0 |