| ***Parameter*** | ***From Red Clover*** | ***IWG estimate*** | **Value set to in IWG** | ***Source*** |
| --- | --- | --- | --- | --- |
| **Phenology** |  |  |  |  |
| ThermalTime.Reponse | X=2,25,37  Y=0,23,0 | X=0,35,45  Y=0,18,0 | *0 0*  30 30  35 0  40 0 | Tmin,Topt,Tmax (Duchene et al. 2021)  These settings better |
| ThermalStress.Response |  |  | 0 0  28 0  30 5  40 10 | Thermal stress damages reproduction (Innes et al. 2015) |
| ThermalStressThreshold |  |  | 60 | Accumulated Thermal Stress before rewind |
| Thermal Stress FT add this in as  StressFactor=ThermalStress x SoilWaterStress during early reproductive phase | new |  | 0 0  30 1  33 1  40 0 | Thermal stress delays phenology |
| SoilWaterStress FW add this in as  StressFactor=ThermalStress x leaf.Photosynthesis.FW x **ProgressionFactor** | new |  | 1 | Soil water stress delays phenology (Chauhan et al. 2019) |
| Phenology.FWThreshold | new |  | 0.35 | Combine with ThermalStressThreshold |
| Emerging.Target.Shootlag | 50 | 100 | 100 | 1.(Lawrence 1957)  2.(Cattani & Asselin 2022) |
| Emerging.Target.ShootRate | 15 | 1.5 | 1.5 | Same as wheat |
| VernalisingDays |  | <6C | 10 degree days  0 1  5 1  5.5 1  6 0.5  7 0 |  |
| DevernalisingDays |  | >35C | 0 0  15 0  35 0  40 1 |  |
| Inductive.Target.SomeProgression |  | 11 0  12 0  13 0  13.5 1 | 11 0  12 0  13.5 0  14 1 | Pji Vernalisation + field studies |
| Inducing.Target |  | 13 | 13 | days |
| Reproductive.Target | 2500 |  | 700 | Jungers(2018), Observed-IWG-Param-Validation.xlsx |
| GrainFilling.Target |  |  | 400 |  |
| Maturing.Target |  |  | 400 |  |
|  |  |  |  |  |
| **Leaf** | **SimpleLeaf copied from Red Clover** |  | **Value set to in IWG** |  |
| InititialOrganWt | 0.0002 |  | 0.018 | Seed wt IWG TKW ~15 |
| CarbonConcentration.MinimumNConc | 0.0275 |  | 0.0275 |  |
| CarbonConcentration.CriticalNConc | 0.05 |  | 0.05 |  |
| CarbonConcentration.MaximumNConc | 0.06 |  | 0.06 |  |
| Photosynthesis.RUE | 1.5 |  | 1.5 |  |
| Photosynthesis.FN | 0 0  0.5 0.5  1 1  1.5 1 |  | 0 0  1 1  1.5 1 | From wheat |
| Photosynthesis.FT | 0 0  2 0  7.5 0.15  15 0.7  18 1  26 1  33 0.1  35 0 |  | -5 0  0 1  25 1  35 0 | From wheat |
| Photosynthesis.FW | 0 0  0.5 0.6  0.8 1  1.5 1 |  | 0 0  0.5 1  1 1 | From wheat |
| Photosynthesis.FVPD | 0 1  10 1  12.5 0.95  40 0 |  | 0 1  10 1  40 0 | From wheat |
| FRGR.PotentialPhotosynthesis.MinRad | 1E-05 |  | 1E-05 |  |
| StomatalConductanceCO2 | 1 |  | 1 |  |
| TargetBiomassProportion.VegetativeInductive | 0.5 |  | 0.8 | (Jungers et al. 2018) |
| TargetBiomassProportion.Reproductive.TargetProportion | 0.5 |  | 0.3 | (Jungers et al. 2018) |
| DMDemands.Structural.StructuralFraction | 0.95 |  | 0.95 | From wheat |
| Area.SpecificLeafArea | 0.03 |  | 0.03 | From Cowra and Pittsworth and TWG=0.024 (Borrajo et al. 2018) |
| ExtinctionCoefficient | 0.9 | Veg 0.5 | 33 1  4 1  5 1  5.7 1  6 1.2  7 1.4  8 1.4 | Change to wheat stage based method |
| ExtinctionCoefficientDead | 0.1 |  | 0.1 |  |
| HeightFunction | 10 25  50 250  100 350  350 450  500 500 |  | 3 10  4 200  5 200  6 1500 | From wheat using stages with extra height |
| SenescenceRate.ReferenceRate | 0.05 |  |  |  |
| SenescenceRate.StageFactor | 3 0.5  4 1  5 1  6 1 |  | 3 1  4 1  5 1  5.7 1.1  6 1.2  9 1.1 | From wheat with added stage. Leaf biomass decrease quadratically as stems and inflorescences increase (Jungers et al. 2018) |
| SenescenceRate.CoverFactor | 3 0.5  4 1  5 1  6 1 |  | 3 0.1  4 0.1  5 0.1  6 0.1 | LAI minor affect on leaf senescence? |
| SenescenceRate.TemperatureFactor | -20 1.5  -5 0.25  0 0.1  5 0.1  17 1  28 1  37.5 1.5 |  |  |  |
| SenescenceRate.SoilMoistureFactor | 0 2  0.5 1  1 1 |  |  |  |
| DetachmentRate.ReferenceRate | 0.1 |  |  |  |
| DetachmentRate.SoilMoistureFactor | 0 0.5  0.5 0.5  1 1 |  |  |  |
| NRetranslocationFactor.ReferenceRate | 0.1 |  |  |  |
| NRetranslocationFactor.TemperatureFactor | 0 0  2 0  7.5 0.15  15 0.7  18 1  26 1  33 0.1  35 0 |  |  |  |
| NRetranslocationFactor.SoilFactor | 0 0  0.5 1  1 1 |  |  |  |
| BiomassRemovalDefaults |  |  | 0.6,0.7,0.24,0.28 | At Harvest (live,dead remove,live,dead som) |
|  |  |  |  |  |
| **Stem** |  | **Stem generic organ was copied from Wheat** | **Value set to in IWG** |  |
| SenescenceRate |  | 3 0  4 0  5 0  6 0  7 0  8 0  9 0  10 0.2  11 0.5 | 3 0  4 0  5 0  6 0  7 0  8 0.1  9 0.2 | X=Stage factor |
| MaximumNConcentration |  | 3 0.07  4 0.04  5 0.04  6 0.015  7 0.012  8 0.012 | 3 0.07  4 0.04  5 0.04  6 0.015  7 0.012  8 0.012  9 0.012 | stages |
| MinimumNConcentration |  | 0.025 | 0.025 | Stem/leaves/spike ratios see Jungers et al. (2018) |
| NRetranslocationFacor.VegetativeGrowth.Fraction |  | 0 | 0 | Emergence-Induction |
| NRetranslocationFacor.ReproductiveGrowth.Fraction |  | 0.5 | 0.5 | StemElongation-Mature see Sharma et al. (2023) |
| DMRetranslocationFactor.VegetativeGrowth |  | 0 | 0 | Emergence-Induction |
| DMRetranslocationFactor.ReproductiveGrowth |  | 0.5 | 0.5 | StemElongation-Mature |
| CriticalNConc.MetabolicNconc.Proportion |  | 0.5 | 0.5 |  |
| CarbonConcentration |  | 0.4 | 0.4 |  |
| DMDemandsStructural.PartitionFraction.PreStemElongation.StemFraction |  | 0.2 | 0.2 | Emergence-Induction |
| DMDemandsStrucural.PartitionFraction.StemElongation.StemFraction |  | 0.7 | 0.7 | StemElongation-Flowering |
| DMDemands.Structural.PartitionFraction.EarEmeregence.StemFraction |  | 0 | 0 | Ripening-Mature |
| DMDemands.Strucural.StructuralFraction.VegetativeGrowth.Fraction |  | 0.3 | 0.3 | Emergence-StemElongation |
| DMDemands.Strucural.StructuralFraction.ReproductiveGrowth.Fraction |  | 0.01 | 0.04 | StemElongation-Ripening |
|  |  |  |  |  |
| **Spike** |  | **Spike generic organ was copied from Wheat** | **Value set to in IWG** |  |
| NRetranslocationFactor.ReproductiveGrowth.ValueDuringGrainFill |  | 0.5 | 0.5 |  |
| MaximumNConc |  | 3 0.01  4 0.01  5 0.01  5.5 0.01  6.5 0.025  7 0.025  8 0.025 | 3 0.01  4 0.01  5 0.01  5.5 0.01  6.5 0.025  7 0.025  8 0.025 | X=phenologyStage |
| MinimumNConc |  | 0.004 | 0.004 |  |
| DMRetranslocationFactor.ReprocductiveGrowth |  | 0.5 | 0.5 |  |
| CriticalNConc.MetabolicNConc.Proportion |  | 0.8 | 0.8 |  |
| SenescenceRate |  | 3 0.07  4 0.04  5 0.04  6 0.015  7 0.012  8 0.012 | 3 0.07  4 0.04  5 0.04  6 0.015  7 0.012  8 0.012 | X=phenology stage |
| CarbonConcentration |  | 0.4 | 0.4 |  |
| DMDemands.Structural.PartitionFraction |  | 5 0  6 0.01  6.01 0.9  8 0.9  9 0 | 5 0  6 0.01  6.01 0.9  8 0  9 0 | X=phenolgy stage |
| DMDemands.StructuralFraction.VegetativeGrowth.StructuralFractionEG |  | 0.3 | 0 |  |
| DMDemands.StructuralFraction.ReproductiveGrowth.StructuralFractionGF |  | 0 | 0.5 |  |
|  |  |  |  |  |
| **Grain** | **Grain reproductive organ was copied from Wheat** |  | **Value set to in IWG** |  |
| GrainsPerGramOfStem | 26 |  | 20 | Field exp. Cowra 2022-3? |
| InitialGrainProportion | 0.1 |  | 0.1 |  |
| MaximumPotentialGrainSize | 0.05 |  | 0.025 | Field exp. Cowra 2022-3 |
| NFillingRate.GrainGrowthPhase.PotentialKernalN | 0.0011 |  | 0.0011 |  |
| NFillingRate.GrainGrowthPhase.Rate.FillingDuration.EarlyFillingDuration | Maturing.Target |  | GrainFilling.Target |  |
| NFillingRate.GrainGrowthPhase.Rate.FillingDuration.GrainFillingDuration | Maturing.Target |  | Maturing.Target |  |
| MinimumNConc | 0.0123 |  | 0.0123 |  |
| MaximumNConcDailyGrowth | 0.035 |  | 0.035 |  |
| MaximumNConc | 0.0463 |  | 0.0463 |  |
| WaterContent | 0.12 |  | 0.12 |  |
| CarbonConcentration | 0.4 |  | 0.4 |  |
|  |  |  |  |  |
| **Root** | **Root organ was copied from Wheat** |  | **Value set to in IWG** |  |
|  |  |  |  |  |
|  |  |  |  |  |

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