

# CropData.txt

This file includes variables relating to crops, including irrigation characteristics, and other vegetation. All vegetation is called crops in the text below, e.g. also forest. *CropData.txt* is **only needed for nutrient or irrigation modelling**, but can be used for water and tracer simulations. Crops in HYPE have a number of static properties, e.g. sowing and harvesting dates, which are read from *CropData.txt*. The handling of these properties assume the catchment is on the Northern hemisphere, i.e. that summer is the growing season. Crops are part of the unique combination making up an SLC class, as defined in [GeoClass.txt](#). To allow for modifying properties of a certain crop within the model domain, e.g. to reflect climate gradients, several crop regions can be defined with corresponding variables `region` in [GeoData.txt](#) and `reg` in *CropData.txt*.

*CropData.txt* is a tab-separated text file located in the `modeldir` folder. The first row contains a column header with variable names. Variable names are not case-sensitive (max. 10 characters, no spaces). The following rows contain variable values for each crop. Columns with headings unknown to HYPE are skipped while reading the file. A text column may contain at most 100 characters. The first column is often used for a descriptive name of the crop, and not read by HYPE. The columns may be in any order. A value must exist for every column and row, i.e. empty cells are not allowed.

Example for *CropData.txt* file structure:

```
name    nr  cropid reg  fn1  fp1  fday1  fdown1  ...
grains  1   1      1   80   5    100    0.1     ...
grains  2   1      2   80   5    120    0.1     ...
grasses 3   2      1    0    0    100    0.1     ...
...     ...  ...    ...  ...  ...  ...     ...
```

All crop characteristics are described in the table below. Column **Type** groups variables according to:

- **General:** IDs to connect crop properties to other indata.
- **Fertiliser:** Variables for fertiliser and manure application. **NOTE:** parameter `fertdays` in [par.txt](#) needs to be set to a value larger than zero for fertiliser and manure to be applied.
- **Turnover:** Crop growth and biomass turnover properties.
- **Irrigation:** Crop irrigation properties.
- **T1 source:** Tracer T1 application.

The general unit (U) is used in tables of parameters and input data where the unit is not defined.

1	<code>nr</code>	-	General	This column with row numbers is usually given to see the order of the crops, but is not read by the program.
2	<code>cropid</code>	-	General	crop ID number (used in <a href="#">GeoClass.txt</a> )
3	<code>reg</code>	-	General	integer, agricultural region number (e.g. production region from agricultural statistics) (corresponds to region in <a href="#">GeoData.txt</a> ). Note, all regions defined in <a href="#">GeoData.txt</a> must also be defined in <a href="#">CropData.txt</a>
4	<code>fn1</code>	<i>kg/(ha yr)</i>	Fertiliser	amount of N in fertiliser (1st application) (100% IN)
5	<code>fp1</code>	<i>kg/(ha yr)</i>	Fertiliser	amount of P in fertiliser (1st application) (100% SP)
6	<code>mn1</code>	<i>kg/(ha yr)</i>	Fertiliser	amount of N in manure (1st application) (50% IN)
7	<code>mp1</code>	<i>kg/(ha yr)</i>	Fertiliser	amount of P in manure (1st application) (50% SP)

8	fday1	<i>julian day</i>	Fertiliser	day number for application of fertiliser (1st application)
9	mday1	<i>julian day</i>	Fertiliser	day number for application of manure (1st application)
10	fdown1	-	Fertiliser	fraction of fertiliser that is tilled down to second soil layer (1st application)
11	mdown1	-	Fertiliser	fraction of manure that is tilled down to second soil layer (1st application)
12	fn2	<i>kg/(ha yr)</i>	Fertiliser	amount of N in fertiliser (2nd application) (100% IN)
13	fp2	<i>kg/(ha yr)</i>	Fertiliser	amount of P in fertiliser (2nd application) (100% SP)
14	mn2	<i>kg/(ha yr)</i>	Fertiliser	amount of N manure (2nd application) (50% IN)
15	mp2	<i>kg/(ha yr)</i>	Fertiliser	amount of P manure (2nd application) (50% SP)
16	fday2	<i>julian day</i>	Fertiliser	day number for application of fertiliser (2nd application)
17	mday2	<i>julian day</i>	Fertiliser	day number for application of manure (2nd application)
18	fdown2	-	Fertiliser	fraction of fertiliser that is tilled down to second soil layer (2nd application)
19	mdown2	-	Fertiliser	fraction of manure that is tilled down to second soil layer (2nd application)
20	resn	<i>kg/(ha yr)</i>	Turnover	amount of N that is added to the pool stored in the soil from decaying plants
21	resp	<i>kg/(ha yr)</i>	Turnover	amount of P that is added to the pool stored in the soil from decaying plants
22	resc	<i>kg/(ha yr)</i>	Turnover	amount of organic C that is added to the pool stored in the soil from decaying plants
23	resday	<i>julian day</i>	Turnover	day number for application of decaying plants, if set to 0, a uniform application all year round is assumed
24	resdown	-	Turnover	fraction of decaying plants that are tilled down to the second soil layer
25	res fast	-	Turnover	fraction of decaying plants that are added to the fast turnover pool, used for N and P
26	up1	<i>g/(m<sup>2</sup> y)</i>	Turnover	parameter for the crop's potential uptake function (logistic growth) - typically 20 g N/m <sup>2</sup> /year for grains, 40 g N/m <sup>2</sup> /year for grasses. Note: must be larger than or equal to up2. A value equal to up2 indicates no uptake of nutrients.
27	up2	-	Turnover	parameter for the crop's potential uptake function (logistic growth) - typically 1
28	up3	<i>1/day</i>	Turnover	parameter for the crop's potential uptake function (logistic growth) - typically 0.12 1/day
29	upupper	-	Turnover	fraction of nutrient uptake in uppermost soil layer
30	pnupr	-	Turnover	P-N relationship for nutrient uptake
31	bd1	<i>julian day</i>	Turnover	day number for spring ploughing, give 0 if no spring ploughing.
32	bd2	<i>julian day</i>	Turnover	day number for start of growth season in spring (typically sow date or a few days later). Default method for start of growth season, but also needed for ground cover/crop cover calculations.
33	bd3	<i>julian day</i>	Turnover	day number for harvest (end of growing season)
34	bd4	<i>julian day</i>	Turnover	day number for autumn ploughing, 0 if no autumn ploughing
35	bd5	<i>julian day</i>	Turnover	day number for autumn crop's grown season start (typically sow date or some days later), 0 if not used

36	cemax1	-	Turnover	Maximum crop cover fraction (between 0 and 1) for harvested crops during the spring-summer growth period. <b>OR</b> Maximum crop cover fraction for permanent vegetation (e.g. forest).
37	cemax2	-	Turnover	Maximum crop cover fraction (between 0 and 1) for harvested crops during the autumn-winter growth period (e.g. set to 0 for spring-sown crops, and to > 0 for autumn-sown crops). Always 0 for permanent vegetation.
38	gcmax1	-	Turnover	Maximum ground cover fraction (between 0 and 1) for harvested crops during the spring-summer growth period. <b>OR</b> Maximum ground cover fraction for permanent vegetation (e.g. forest).
39	gcmax2	-	Turnover	Maximum ground cover fraction (between 0 and 1) for harvested crops during the autumn-winter growth period. Always 0 for permanent vegetation.
40	plantday	<i>julian day</i>	Irrigation	day number for planting
41	lengthini	<i>days</i>	Irrigation	number of days for initial crop growth period
42	kcbini	-	Irrigation	basal crop coefficient for initial crop growth period
43	lengthdev	<i>days</i>	Irrigation	number of days for development crop growth period
44	lengthmid	<i>days</i>	Irrigation	number of days for middle crop growth period
45	kcbmid	-	Irrigation	basal crop coefficient for middle crop growth period
46	lengthlate	<i>days</i>	Irrigation	number of days for late crop growth period
47	kcbend	-	Irrigation	basal crop coefficient for end of late crop growth period
48	dlref	-	Irrigation	reference depletion level
49	imm_start	<i>julian day</i>	Irrigation	day number for start of immersion period
50	imm_end	<i>julian day</i>	Irrigation	day number for end of immersion period (immersion period must be contained in irrigation period)
51	daylength	<i>hours</i>	Turnover	length of day needed to start accumulate GDD (alternative method for start of growth season)
52	gddsow	<i>degreedays</i>	Turnover	GDD needed to start growth season (alternative method for start of growth season)
53	basetemp	<i>degree Celsius</i>	Turnover	temperature deducted from airtemp when calculating GDD (typical value 0-10) (alternative method for start of growth season)
54	firstday	<i>julian day</i>	Turnover	first day when GDD accumulation can start. Usually set to 1 (alternative method for start of growth season)
55	tamount	<i>U/ha</i>	T1 source	amount of T1 to be applied per year and ha
56	tyear	-	T1 source	year to apply T1, if zero T1 will be applied every year
57	tday	<i>julian day</i>	T1 source	day to start T1 application
58	tnumdays	<i>days</i>	T1 source	number of days with T1 application (with start at tday)
59	tdaydown	<i>julian day</i>	T1 source	day number for T1 to be tilled down
60	tdown1	-	T1 source	fraction of T1 above soil pool that are tilled down to the first soil layer
61	tdown2	-	T1 source	fraction of T1 above soil pool that are tilled down to the second soil layer