**Determining Irris Scheduler soil horizon data**

Copyright © 2015-2016 Purdue Research Foundation.

First revision June 8, 2012; last revised April 15, 2016

(1) Data required by nitrogen model for each soil horizon. Note that for U.S. soils, Irris Scheduler can retrieve this data automatically from the USDA-NRCS Soil Data Mart.

|  |  |  |
| --- | --- | --- |
| **Setting (column) name in .irr file** | **Soil Data Mart column name** | **Notes** |
| Depth | hzdepb\_r | In centimeters; need soil horizons to crop’s rooting depth |
| Texture |  | Determined as described below |
| AWC |  | In cm/cm; determined as described below |
| WiltingPoint | wfifteenbar\_r | In cm/cm (fraction, rather than %) |
| BulkDensity | dbthirdbar\_r | In gm/cm3 |
| OM | om\_r | In % |
| pH | ph1to1h2o\_r (mineral soils); ph01mcacl2\_r (organic soils) |  |
| CEC | cec7\_r | In cmol+/kg (same as meq/100g) |

(2) Soil Data Mart documentation is here:

<http://sdmdataaccess.nrcs.usda.gov/documents/TableColumnDescriptionsReport.pdf>

(3) Texture for each horizon can be determined using this on-line calculator:

<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_054167>

This Excel spreadsheet can also be used:

<https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053196.xls>

The following Soil Data Mart columns correspond to the calculator inputs. See item (2) above for descriptions of columns.

|  |
| --- |
| sandtotal\_r |
| silttotal\_r |
| claytotal\_r |
| sandvc\_r |
| sandco\_r |
| sandmed\_r |
| sandfine\_r |
| sandvf\_r |

Valid texture abbreviations for Irris Scheduler are as follows:

|  |  |
| --- | --- |
| GR | Gravel |
| COS | Coarse sand |
| S | Sand |
| FS | Fine sand |
| VFS | Very fine sand |
| LCOS | Loamy coarse sand |
| LS | Loamy sand |
| LFS | Loamy fine sand |
| LVFS | Loamy very fine sand |
| COSL | Coarse sandy loam |
| SL | Sandy loam |
| FSL | Fine sandy loam |
| VFSL | Very fine sandy loam |
| L | Loam |
| SIL | Silt loam |
| SI | Silt |
| SCL | Sandy clay loam |
| CL | Clay loam |
| SICL | Silty clay loam |
| SC | Sandy clay |
| SIC | Silty clay |
| C | Clay |
| MUCK | Muck |

(4) Available water capacity (AWC) can be determined for each horizon using this document. Note that AWC = field capacity minus wilting point.

[http://www.purdue.edu/agsoftware/irrigation/MO6 Guide for Determining Available Water Capacity.doc](http://www.purdue.edu/agsoftware/irrigation/MO6%20Guide%20for%20Determining%20Available%20Water%20Capacity.doc)

Here are the AWC inputs:

|  |  |
| --- | --- |
| Texture | As determined in (3) above |
| Clay % | Soil Data Mart claytotal\_r; only needed with clay soils |
| Fragment percent volume | Can be determined from Soil Data Mart sieveno10\_r, frag3to10\_r, fraggt10\_r and dbthirdbar\_r; will be 0 for many soils |
| Electrical conductivity | Soil Data Mart ec\_r; will be 0 for many soils; in dS/m (same as mmhos/cm) |

(5) Wilting point can be estimated using Table 1 given here:

[http://publications.decagon.com/Application Notes/13388\_Determining Perm Wilt WC of Soils using WP4C\_Print.pdf](http://publications.decagon.com/Application%20Notes/13388_Determining%20Perm%20Wilt%20WC%20of%20Soils%20using%20WP4C_Print.pdf)

(6) Bulk density can be estimated using the table here:

<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/office/ssr10/tr/?cid=nrcs144p2_074844>

(7) Soil organic matter (OM), pH and CEC for the surface horizon can be determined by a routine soil test. Values for deeper horizons can be determined by sampling at the desired horizon depths.