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default-namespace: wheat\_trait  
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remark: Wheat trait ontology is prepared by Rosemary Shrestha, CIMMYT  
for the Generation Challenge Program.

[Term]

id: CO\_321:0000000  
name: CGIAR wheat trait ontology  
def: " This ontology defines traits of the International Wheat Information System (IWIS) database and the descriptors for wheat (revised) published by IBPGR, Rome 1985." [CO:rs]

[Term]

id: CO\_321:0000001  
name: agronomic trait  
def: "Describes important agronomic characters of wheat." [CO:rs]  
relationship: part\_of CO\_321:0000000 ! CGIAR wheat trait ontology

[Term]

id: CO\_321:0000002  
name: morphological trait  
def: "Describes important morphological characters of wheat." [CO:rs]  
relationship: part\_of CO\_321:0000000 ! CGIAR wheat trait ontology

[Term]

id: CO\_321:0000003  
name: quality trait  
def: "Describes important quality related traits of wheat which are evaluated for its suitability for a specific final product. For instance, soft wheat is judged by its suitability for the production of cakes, cookies, or crackers." [CO:rs]  
relationship: part\_of CO\_321:0000000 ! CGIAR wheat trait ontology

[Term]

id: CO\_321:0000004  
name: stress trait  
def: "Response by the plant in terms of resistivity or sensitivity to abiotic or/and biotic stresses." [Gramene Plant Trait Ontology:TO\0000164]  
relationship: part\_of CO\_321:0000000 ! CGIAR wheat trait ontology

[Term]

id: CO\_321:0000005  
name: above ground biomass  
def: "Measurement of total dried above ground biomass in g/plot or kg/ha or kg/plot or ton/ha." [CO:rs]  
synonym: "BIOMAS" RELATED []  
synonym: "Biomass yield" RELATED []

xref: IWIS\_TRAITID:1164  
xref: TO:0000327  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000006  
name: canopy temperature depression  
def: "The difference between air and canopy temperature which is used as a screening tool for wheat yield and stress tolerance in large breeding populations."  
[http://crops.confex.com/crops/2005am/techprogram/P8099.HTM]  
comment: Canopy temperature depression is highly suitable for selecting physiologically superior lines in warm, low relative humidity environments where high evaporative demand leads to leaf cooling of up to 10C below ambient temperatures.  
xref: IWIS\_TRAITID:1326  
xref: Gramene Plant Trait Ontology:TO\:0000157  
is\_a: CO\_321:0000140 ! physiological trait

[Term]

id: CO\_321:0000007  
name: days to heading  
def: "Number of days required for the inflorescence (panicle) to emerge from the flag leaf of a plant or a group of plants in a study."  
[Gramene Plant Trait Ontology:TO\:0000137]  
synonym: "DAYHD" RELATED []  
xref: IWIS\_TRAITID:1149  
xref: Gramene Plant Trait Ontology:TO\:0000137  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000008  
name: days to maturity  
def: "Number of days from planting to harvest at maturity." [CO:rs]  
synonym: "DAYSMT" RELATED []  
synonym: "maturity" RELATED []  
xref: Gramene Plant Trait Ontology:TO\:0000469  
xref: IWIS\_TRAITID:1150  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000009  
name: early vigor  
def: "A visual rating of vegetative growth using Zadok growth stages and determine whether it is early or late." [CO:rs "personal communication with Thomas Payne, CIMMYT"]  
synonym: "ERLVIG" RELATED []  
synonym: "vegetative vigor" RELATED []  
xref: IWIS\_TRAITID:1167  
xref: Gramene Plant Trait Ontology:TO\:0000296  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000010  
name: germination date  
def: "Record of the day on which a seedling is first observed."  
[CO:rs]  
synonym: "emergence date" RELATED []  
synonym: "GERINI" RELATED []  
xref: IWIS\_TRAITID:1366  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000011  
name: germination percentage  
def: "Percentage of grains that germinate under proper condition."  
[CO:rs]  
synonym: "GERMI%" RELATED []  
synonym: "percent germination" RELATED []  
xref: IWIS\_TRAITID:1307  
xref: Gramene Plant Trait Ontology:TO\:0010001  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000012  
name: grain moisture content  
def: "Moisture content of grain measured by grain moisture analyzer in percentage." [CO:rs]  
synonym: "grain moisture" RELATED []  
synonym: "GRNH20" RELATED []  
xref: IWIS\_TRAITID:1155  
xref: Gramene Plant Trait Ontology:TO\:0000057  
is\_a: CO\_321:0000003 ! quality trait

[Term]  
id: CO\_321:0000013  
name: grain yield  
def: "The product of accumulating dry matter (i.e., biomass) and allocating a portion of the total aboveground biomass to the grain."  
[CO:rs]  
synonym: "GRNYLD" RELATED []  
xref: IWIS\_TRAITID:1144  
xref: Gramene Plant Trait Ontology:TO\:0000396  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000014  
name: ground cover  
def: "Measurement of ground surface covered by the plant in percentage at 5 leaf stage." [CO:rs "personal communication with Thomas Payne, CIMMYT"]  
comment: It is measured in percentage at 5 leaf stage.  
synonym: "GRCOV5" RELATED []  
xref: IWIS\_TRAITID:1285

is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000015

name: growth habit

def: "A qualitative description of the growth habit of the plant whether erect/semi-erect/prostrate/spreading/semi-spreading."

[CIMMYT:jb, CO:rs]

synonym: "GHABIT" RELATED []

xref: IWIS\_TRAITID:1310

xref: Gramene Plant Trait Ontology:TO\.:0002756

is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000016

name: growth stage

def: "A visual observation of growth stages based on Zadok Decimal code." [CO:rs]

synonym: "GRWSTG" RELATED []

xref: IWIS\_TRAITID:1374

is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000017

name: initial germination value

synonym: "GERVAL" RELATED []

xref: IWIS\_TRAITID:1367

is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000018

name: leaf conductance

def: "Rating the passage of either water vapor or carbon dioxide through the stomata." [CO:rs "personal communication with Matthew Reynolds, CIMMYT"]

synonym: "LEFCND" RELATED []

xref: IWIS\_TRAITID:1403

xref: Gramene Plant Trait Ontology:TO\.:0000522

is\_a: CO\_321:0000140 ! physiological trait

[Term]

id: CO\_321:0000019

name: moisture percentage

def: "Total percentage of water in wheat." [CO:rs]

xref: IWIS\_TRAITID:1369

is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000020

name: plant height

def: "Height of plant at maturity, measured in cm from ground to top of spike, excluding awns." [CO:rs "AGPG:IBPGR/85/210"]

synonym: "PLNTHT" RELATED []  
xref: IWIS\_TRAITID:1151  
xref: Gramene Plant Trait Ontology:TO\ :0000207  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000021  
name: days to seedling emergence  
def: "Counted as days from sowing to the seedling emergence." [CO:rs]  
is\_a: CO\_321:0000001 ! agronomic trait  
created\_by: RSHRESTHA  
creation\_date: 2009-08-10T02:49:13Z

[Term]  
id: CO\_321:0000022  
name: relative maturity  
def: "A ratio of the maturity days that determined from the plant to best local check which represents the best locally adopted germplasm at each location grown in standard or normal environment." [CO:rs "personal communication with Thomas Payne, CIMMYT"]  
synonym: "RELTHD" RELATED []  
xref: IWIS\_TRAITID:1386  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000023  
name: relative heading  
def: "A ratio of the heading days that determined from the plant to best local check which represents the best locally adopted germplasm at each location grown in standard or normal environment." [CO:rs "personal communication with Thomas Payne, CIMMYT"]  
synonym: "RELMT" RELATED []  
xref: IWIS\_TRAITID:1385  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000024  
name: relative plant height  
def: "A ratio of the plant height determined from the plant to local check which represents the best locally adopted germplasm at each location grown in standard or normal environment." [CO:rs "personal communication with Thomas Payne, CIMMYT"]  
synonym: "RELPH" RELATED []  
xref: IWIS\_TRAITID:1387  
xref: Gramene Plant Trait Ontology:TO\ :0001034  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000025  
name: 1000-grain weight  
def: "Measurement of 1000 well-developed grains." [CO:rs]

synonym: "1000-seed weight" RELATED [Gramene Plant Trait  
Ontology:TO\0000382]  
synonym: "1000GW" RELATED []  
synonym: "THOUWT" RELATED []  
xref: IWIS\_TRAITID:1147  
xref: Gramene Plant Trait Ontology:TO\0000382  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]  
id: CO\_321:0000026  
name: awn length  
def: "Measurement of awn length." [CO:rs]  
synonym: "AWNLNG" RELATED []  
xref: IWIS\_TRAITID:1417  
xref: Gramene Plant Trait Ontology:TO\0000072  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000027  
name: awnedness  
def: "Observation of awn type whether awnless/awnletted (short  
awns)/awned (conspicuous awns)." [CO:rs]  
synonym: "awn presence" RELATED []  
xref: Gramene Plant Trait Ontology:TO\0002734  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000028  
name: chlorophyll content  
def: "Measures the chlorophyll content in a green tissue. Includes  
both chlorophyll-a and chlorophyll-b. Chlorophyll is the green pigment  
found in plants." []  
synonym: "CLPHYL" RELATED []  
xref: IWIS\_TRAITID:1402  
xref: Gramene Plant Trait Ontology:TO\0000495  
is\_a: CO\_321:0000140 ! physiological trait

[Term]  
id: CO\_321:0000029  
name: coleoptile length  
def: "Length of coleoptile (a protective sheath that surrounds the  
shoot tip and the embryonic leaves of the young shoot of grasses) is  
measured in cm (centimeter)." [CO:rs]  
synonym: "CLPLNG" RELATED []  
xref: IWIS\_TRAITID:1425  
xref: Gramene Plant Trait Ontology:TO\0001007  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000030  
name: days to flag leaf emergence

def: "Counted as days from sowing to the first leaf emergence."

[CO:rs]

synonym: "EMERGE" RELATED []

xref: IWIS\_TRAITID:1004

is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000031

name: glume color

def: "Color observation on the outer glume whether white/red to brown/purple to black at maturity." [CO:rs "AGPG:IBPGR/85/210"]

synonym: "GLMCOL" RELATED []

xref: IWIS\_TRAITID:1372

xref: Gramene Plant Trait Ontology:TO\0000221

is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000032

name: glume length

def: "Length of glume measured." [CO:rs]

synonym: "GLMLNG" RELATED []

xref: IWIS\_TRAITID:1420

is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000033

name: glume pubescence density

def: "Measurement of glume hairiness density on outer side of sterile glume." [CO:rs]

synonym: "GLMPDN" RELATED []

xref: IWIS\_TRAITID:1422

is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000034

name: glume pubescence length

def: "Measurement of glume pubescence length on outer side of sterile glume." [CO:rs]

xref: IWIS\_TRAITID:1423

is\_a: CO\_321:0000002 ! morphological trait

created\_by: RSHRESTHA

creation\_date: 2009-08-10T02:50:25Z

[Term]

id: CO\_321:0000035

name: glume waxiness

def: "Measurement of presence of wax in glume." [CO:rs]

synonym: "GLMWAX" RELATED []

xref: IWIS\_TRAITID:1412

is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000036  
name: glume width  
def: "Measurement of width of glume." [CO:rs]  
synonym: "GLMWID" RELATED []  
xref: IWIS\_TRAITID:1421  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000037  
name: grain color  
def: "A visual measurement of grain color whether white/red/purple at maturity." [CO:rs "AGPG:IBPGR/85/210"]  
synonym: "fruit color" RELATED []  
synonym: "GRNCOL" RELATED []  
xref: IWIS\_TRAITID:1286  
xref: Gramene Plant Trait Ontology:TO\0002617  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000038  
name: grain per spike  
def: "Count of total number of grains on an average of five spikes." [CO:rs]  
synonym: "grain per panicle" RELATED []  
synonym: "GRNSPK" RELATED []  
xref: IWIS\_TRAITID:1156  
xref: Gramene Plant Trait Ontology:TO\0002759  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000039  
name: grain plumpness  
def: "A qualitative trait measuring degree of endosperm has filled." [CO:rs "AGPG:IBPGR/85/210, personal communication with Thomas Payne and Javier Pena, CIMMYT"]  
comment: This trait is to determine shrunken kernels resulting from stress (drought, heat), or resulting from effects of plant diseases not allowing the crop to finish up grain filling properly.  
synonym: "GRNPLU" RELATED []  
xref: IWIS\_TRAITID:1235  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000040  
name: grain size  
def: "Measurement of grain size." [CO:rs "AGPG:IBPGR/85/210"]  
synonym: "GRNSIZ" RELATED []  
xref: IWIS\_TRAITID:1136  
xref: Gramene Plant Trait Ontology:TO\0000391  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000041  
name: grain per spikelet  
def: "The total numbers of grains per spikelet." [CO:rs]  
synonym: "GRNSPL" RELATED []  
xref: IWIS\_TRAITID:1419  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000042  
name: seed vitreousness  
def: "One of the key quality parameters in the determination of Durum quality referring to translucent or glass-like appearance when seeds are transversely sectioned and observed whether not vitreous/partly vitreous/vitreous. It is associated with high protein and hard grain." [CO:rs "AGPG:IBPGR/85/210, personal communication with Javier Pena, CIMMYT"]  
comment: Partly vitreous endosperm is related to the efficiency in N fertilization to allow accumulation of acceptable levels of protein content in the grain. Deficient N fertilization results in low grain protein content and starchy patches in the endosperm.  
synonym: "grain vitreousness" RELATED []  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000043  
name: kernel texture  
def: "A visual observation of the relative hardness of a kernel whether soft/intermediate/hard ." [CO:rs]  
synonym: "grain texture" RELATED []  
synonym: "KERAPP" RELATED []  
synonym: "kernel appearance" RELATED []  
synonym: "seed texture" RELATED []  
xref: IWIS\_TRAITID:1183  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000044  
name: leaf length  
def: "Actual measurement of leaf length." [CO:rs]  
synonym: "LEFLNG" RELATED []  
xref: IWIS\_TRAITID:1404  
xref: Gramene Plant Trait Ontology:TO\ :0000135  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000045  
name: leaf pubescence density  
def: "Measurement of leaf hairiness density." [CO:rs]  
synonym: "LFPDEN" RELATED []  
xref: IWIS\_TRAITID:1407  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000046  
name: leaf pubescence length  
def: "Measurement of leaf pubescent length." [CO:rs]  
xref: IWIS\_TRAITID:1408  
is\_a: CO\_321:0000002 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2009-08-10T02:51:27Z

[Term]  
id: CO\_321:0000047  
name: leaf thickness  
def: "Measurement of leaf thickness." [CO:rs]  
synonym: "LEFTHK" RELATED []  
xref: IWIS\_TRAITID:1406  
xref: Gramene Plant Trait Ontology:TO\0000258  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000048  
name: leaf waxiness  
def: "A visual observation of presence of wax in leaf." [CO:rs]  
synonym: "leaf gloss" RELATED []  
synonym: "LEFWAX" RELATED []  
xref: IWIS\_TRAITID:1410  
xref: Gramene Plant Trait Ontology:TO\0000709  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000049  
name: leaf width  
def: "Measurement of leaf width." [CO:rs]  
synonym: "LEFWID" RELATED []  
xref: IWIS\_TRAITID:1405  
xref: Gramene Plant Trait Ontology:TO\0000370  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000050  
name: neck break  
def: "Observation of spike break from the base of head." [CO:rs]  
synonym: "NBREAK" RELATED []  
xref: IWIS\_TRAITID:1163  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000051  
name: node number  
def: "Number of nodes on stem." [TO:0000634]  
synonym: "NODENU" RELATED []  
xref: IWIS\_TRAITID:1413  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000052  
name: peduncle length  
def: "Measurement of peduncle length." [CO:rs]  
synonym: "PEDLN1, PEDLN2, PEDLN3, PEDLN4, PEDLN5, PEDLNG" RELATED []  
xref: IWIS\_TRAITID:1400  
xref: Gramene Plant Trait Ontology:TO\0002691  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000053  
name: peduncle pubescence density  
def: "Measurement of peduncle hairiness density." [CO:rs]  
synonym: "PEDPBD" RELATED []  
xref: IWIS\_TRAITID:1409  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000054  
name: peduncle waxiness  
def: "A visual observation of presence of wax in peduncle." [CO:rs]  
synonym: "PEDWAX" RELATED []  
xref: IWIS\_TRAITID:1411  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000055  
name: spike density  
def: "A visual measure of density of a wheat spike."  
[AGPG:IBPGR/85/210]  
synonym: "SPKDEN" RELATED []  
xref: IWIS\_TRAITID:1424  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000056  
name: spike length  
def: "Measurement of spike length." [CO:rs]  
synonym: "spikelet length" RELATED []  
synonym: "SPKLNG" RELATED []  
xref: IWIS\_TRAITID:1416  
xref: Gramene Plant Trait Ontology:TO\0000040  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000057  
name: spike shattering  
def: "Observation of grains dehiscence from spike at maturity." [CO:rs]  
"personal communication with Thomas Payne, CIMMYT"  
synonym: "FRGFWT" RELATED []  
xref: IWIS\_TRAITID:1162

is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000058  
name: spikelet per spike  
def: "Number of spikelets per spike based on the average of five spikes." [AGPG:IBPGR/85/210]  
synonym: "panicle length" RELATED []  
synonym: "SPLSPK" RELATED []  
xref: IWIS\_TRAITID:1418  
xref: Gramene Plant Trait Ontology:TO\ :0000565  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000059  
name: stay green  
def: "The color of plant and the photosynthetic organs remain green compared to turning yellow and or brown at the time of senescing." [CO:rs]  
synonym: "STAGRE" RELATED []  
xref: IWIS\_TRAITID:1166  
xref: Gramene Plant Trait Ontology:TO\ :0002712  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000060  
name: stem height  
def: "Measurement of stem height." [CO:rs]  
synonym: "STMHG, STMHG1, STMHG2, STMHG3, STMHG4, STMHG5" RELATED []  
xref: IWIS\_TRAITID:1399  
xref: Gramene Plant Trait Ontology:TO\ :0000576  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000061  
name: stem solidness  
def: "The trait evaluates the solidness of stem as either solid/intermediate or hollowness." [CO:rs "personal communication with Thomas Payne, CIMMYT"]  
synonym: "stem hollowness" RELATED []  
synonym: "STMSOL" RELATED []  
xref: IWIS\_TRAITID:1415  
is\_a: CO\_321:0000002 ! morphological trait

[Term]

id: CO\_321:0000062  
name: stem thickness  
def: "Measurement of stem thickness." [CO:rs]  
synonym: "STMTHK" RELATED []  
xref: IWIS\_TRAITID:1414  
xref: Gramene Plant Trait Ontology:TO\ :0000339  
is\_a: CO\_321:0000002 ! morphological trait

[Term]  
id: CO\_321:0000063  
name: stomatal resistance  
def: "Resistance to diffusion of water vapor through a plants stomata." [CO:rs]  
synonym: "STMRES" RELATED []  
xref: CO:0000523  
xref: IWIS\_TRAITID:1373  
is\_a: CO\_321:0000140 ! physiological trait

[Term]  
id: CO\_321:0000064  
name: cookie spread factor  
def: "The ratio between average height and width of 5 cookies." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
synonym: "SPREAD" RELATED []  
xref: IWIS\_TRAITID:1142  
is\_a: CO\_321:0000003 ! quality trait

[Term]  
id: CO\_321:0000065  
name: crumb structure  
def: "Measurement of the cellular structure of wheat bread crumb whether poor/fair/good/very good." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
synonym: "CRMSTR" RELATED [IWIS\_TRAITID:1138]  
xref: IWIS\_TRAITID:1138  
is\_a: CO\_321:0000003 ! quality trait

[Term]  
id: CO\_321:0000066  
name: flour falling number  
def: "The falling number is defined as the time in seconds required stirring and allowing stirrer to fall a measured distance through a hot aqueous flour or meal gel undergoing liquefaction due to a-Amylase activity." [http://www.qta.com]  
synonym: "FLRFNO" RELATED []  
xref: IWIS\_TRAITID:1383  
is\_a: CO\_321:0000003 ! quality trait

[Term]  
id: CO\_321:0000067  
name: flour protein content  
def: "Total protein percent (corrected to 14.0% moisture basis) in refined flour." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
synonym: "FLRPRO" RELATED []  
xref: IWIS\_TRAITID:1131  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000068  
name: flour yield  
def: "Percentage of flour recovered during milling." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
synonym: "FLRYLD" RELATED []  
xref: IWIS\_TRAITID:1132  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000069  
name: gluten content  
def: "Percentage of wet gluten in flour." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000070  
name: gluten type  
def: "Determination of gluten type whether weak-tenacious/tenacious/weak/medium strong/Strong/Overly strong." [CIMMYT:jp, CO:rs]  
synonym: "GLUTYP" RELATED []  
xref: IWIS\_TRAITID:1125  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000071  
name: grain falling number  
def: "Indication of the amount of sprout damage that has occurred within a wheat sample. Falling number value of 350 seconds or longer indicates a low enzyme activity and very sound wheat quality. As the amount of enzyme activity increases, the falling number decreases. Values below 200 seconds indicate high levels of enzyme activity." [CO:rs]  
xref: IWIS\_TRAITID:1139  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000072  
name: grain hardness  
def: "Determination of grain quality whether very soft/medium soft/medium hard/ hard/very hard." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
synonym: "GRNHRD" RELATED []  
xref: IWIS\_TRAITID:1134  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000073  
name: grain protein content  
def: "It is determined in percentage of protein (corrected to 12.5% moisture basis) in the whole wheat grain samples." [CO:rs]

synonym: "GRNPRO" RELATED []  
xref: IWIS\_TRAITID:1130  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000074  
name: semolina protein content  
def: "Protein content in durum wheat semolina." [CO:rs]  
xref: IWIS\_TRAITID:1141  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000075  
name: semolina yellow color value  
def: "Measurement of flour/semolina yellow color with the Minolta chromameter using the color scale b." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
synonym: "yellow pigment" RELATED []  
is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000076  
name: abiotic stress trait  
def: "Response by the plants in terms of resistivity or sensitivity to abiotic stress." [Gramene Plant Trait Ontology:TO\:0000168]  
is\_a: CO\_321:0000004 ! stress trait

[Term]

id: CO\_321:0000077  
name: biotic stress trait  
def: "Response by the plants in terms of resistivity or sensitivity to biotic stress." [Gramene Plant Trait Ontology:TO\:0000179]  
is\_a: CO\_321:0000004 ! stress trait

[Term]

id: CO\_321:0000078  
name: acidic soil tolerance  
def: "Assessed for sensitivity of plants to acid soil." [CO:rs]  
synonym: "ACDTOL" RELATED []  
xref: IWIS\_TRAITID:1159  
is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]

id: CO\_321:0000079  
name: aluminum tolerance  
def: "Assessed for sensitivity of plant to aluminium." [CO:rs]  
synonym: "ALUTOL" RELATED []  
xref: IWIS\_TRAITID:1160  
is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]

id: CO\_321:0000080

name: cold tolerance  
def: "Observation of growth at temperatures lower than the optimum temperature." [CO:rs "ISBN:9706480773"]  
synonym: "CLDTOL" RELATED []  
synonym: "CTOL" RELATED []  
xref: IWIS\_TRAITID:1165  
xref: Gramene Plant Trait Ontology:TO\ :0000303  
is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]

id: CO\_321:0000081  
name: sprouting tolerance  
def: "Assessed for the grain embryo dormancy." [CO:rs "ISBN:9706480773"]  
synonym: "SPROUT" RELATED []  
xref: IWIS\_TRAITID:1168  
is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]

id: CO\_321:0000082  
name: alternaria leaf blight  
def: "Scored for the plant response to the agent *Alternaria triticina* causing alternaria leaf blight disease. " [CO:rs]  
synonym: "ATRIT" RELATED []  
xref: IWIS\_TRAITID:1111  
is\_a: CO\_321:0000122 ! fungal disease

[Term]

id: CO\_321:0000083  
name: animal damage  
def: "Scored for the plant damages caused by various animals." [CO:rs]  
is\_a: CO\_321:0000077 ! biotic stress trait

[Term]

id: CO\_321:0000084  
name: ant damage  
def: "Scored for the plant damage caused by ants." [CO:rs]  
synonym: "DMGANT" RELATED []  
xref: IWIS\_TRAITID:1034  
is\_a: CO\_321:0000089 ! insect damage

[Term]

id: CO\_321:0000085  
name: aphid damage  
def: "Scored for the damage caused by various species of aphids." [CO:rs]  
synonym: "DMGAPH" RELATED []  
xref: IWIS\_TRAITID:1026  
is\_a: CO\_321:0000089 ! insect damage

[Term]

id: CO\_321:0000086

name: armyworm damage  
def: "Scored for the plant damage caused by armyworm." [Gramene Plant Trait Ontology:TO\:0000273]  
synonym: "AWRRS" RELATED []  
synonym: "DMGARM" RELATED []  
xref: IWIS\_TRAITID:1023  
is\_a: CO\_321:0000089 ! insect damage

[Term]

id: CO\_321:0000087  
name: bird damage  
def: "Scored for the plant damage caused by birds." [CO:rs]  
synonym: "BD" RELATED []  
synonym: "DMGBIR" RELATED []  
xref: IWIS\_TRAITID:1021  
xref: Gramene Plant Trait Ontology:TO\:0000260  
is\_a: CO\_321:0000083 ! animal damage

[Term]

id: CO\_321:0000088  
name: hessian fly damage  
def: "Scored for the plant damage caused by hessian fly, *Maytiola destructor*." [CO:rs]  
synonym: "MDEST" RELATED []  
xref: IWIS\_TRAITID:1107  
is\_a: CO\_321:0000089 ! insect damage

[Term]

id: CO\_321:0000089  
name: insect damage  
def: "Scored for the plant damage caused by any insects." [Gramene Plant Trait Ontology:TO\:0000261]  
synonym: "DMGINS" RELATED []  
xref: IWIS\_TRAITID:1019  
xref: IWIS\_TRAITID:1171  
is\_a: CO\_321:0000077 ! biotic stress trait

[Term]

id: CO\_321:0000090  
name: rodent damage  
def: "Scored for the plant damage caused by rodent." [CO:rs]  
synonym: "DMGROD" RELATED []  
synonym: "rat damage" EXACT []  
xref: IWIS\_TRAITID:1028  
xref: Gramene Plant Trait Ontology:TO\:0000117  
is\_a: CO\_321:0000083 ! animal damage

[Term]

id: CO\_321:0000091  
name: russian wheat aphid damage  
def: "Scored for the plant damage caused by russian wheat aphid, *Diuraphis noxis*." [CO:rs]

synonym: "DNOXI" RELATED []  
xref: IWIS\_TRAITID:1106  
is\_a: CO\_321:0000089 ! insect damage

[Term]  
id: CO\_321:0000092  
name: sawfly damage  
def: "Scored for the plant damage caused by sawfly, *Cephus cinctus*."  
[CO:rs]  
synonym: "CPYGM" RELATED []  
xref: IWIS\_TRAITID:1108  
is\_a: CO\_321:0000089 ! insect damage

[Term]  
id: CO\_321:0000093  
name: snail damage  
def: "Scored for the plant damage caused by snails." [CO:rs]  
synonym: "DMGSNA" RELATED []  
xref: IWIS\_TRAITID:1027  
is\_a: CO\_321:0000089 ! insect damage

[Term]  
id: CO\_321:0000094  
name: suni pest damage  
def: "Scored for the plant damage caused by suni pest." [CO:rs]  
synonym: "DMGSUP" RELATED []  
xref: IWIS\_TRAITID:1029  
is\_a: CO\_321:0000089 ! insect damage

[Term]  
id: CO\_321:0000095  
name: stripe mosaic  
def: "Scored for the response to the agent barley stripe mosaic virus causing barley stripe mosaic disease." [CO:rs]  
synonym: "BSM.V" RELATED []  
xref: IWIS\_TRAITID:1100  
is\_a: CO\_321:0000139 ! viral disease

[Term]  
id: CO\_321:0000096  
name: yellow dwarf  
def: "Scored for the plant response to the agent wheat yellow dwarf virus causing wheat yellow dwarf disease." [CO:rs]  
synonym: "barley yellow dwarf resistance" RELATED []  
synonym: "BYD.V" RELATED []  
xref: IWIS\_TRAITID:1099  
is\_a: CO\_321:0000139 ! viral disease

[Term]  
id: CO\_321:0000097  
name: black point

def: "Scored for the plant response to the agents Alternaria, Helminthosporium and Fusarium spp. causing black point disease."  
[CO:rs]  
synonym: "BLKPT" RELATED []  
xref: IWIS\_TRAITID:1098  
is\_a: CO\_321:0000122 ! fungal disease

[Term]  
id: CO\_321:0000098  
name: bunt  
def: "Scored for the plant response to the agent Tilletia species causing bunt disease." [CO:rs]  
synonym: "stinking bunt" RELATED []  
synonym: "TILSP" RELATED []  
is\_a: CO\_321:0000122 ! fungal disease

[Term]  
id: CO\_321:0000099  
name: tilletia laevis common bunt  
def: "Scored for the plant response to the agent Tilletia laevis causing common bunt disease." [CO:rs]  
synonym: "TLAEV" RELATED []  
xref: IWIS\_TRAITID:1270  
is\_a: CO\_321:0000098 ! bunt

[Term]  
id: CO\_321:0000100  
name: tilletia tritici common bunt  
def: "Scored for the plant response to the agent Tilletia tritici causing common bunt disease." [CO:rs]  
synonym: "TTRIT" RELATED []  
xref: IWIS\_TRAITID:1271  
is\_a: CO\_321:0000098 ! bunt

[Term]  
id: CO\_321:0000101  
name: dwarf bunt  
def: "Scored for the plant response to the agent Tilletia controversa causing dwarf bunt disease." [CO:rs]  
synonym: "TCONT" RELATED []  
xref: IWIS\_TRAITID:1095  
is\_a: CO\_321:0000098 ! bunt

[Term]  
id: CO\_321:0000102  
name: eyespot  
def: "Scored for the plant response to the agents necrotrophic fungus Tapesia yallundae (Pseudocercospora herpotrichoide W-type) and Tapesia acuformis (Pseudocercospora herpotrichoides R-type) causing eye spot disease. Symptoms: The eye shape elliptical lesions forms on lower base of stem and lower leaf sheath. The eyespots are straw yellow in color from the middle and are surrounded by the greenish

brown to dark brown rings." [CO:rs,  
[http://en.wikipedia.org/wiki/Eyespot\\_\(wheat\)](http://en.wikipedia.org/wiki/Eyespot_(wheat))]  
synonym: "PHERP" RELATED []  
synonym: "strawbreaker" RELATED []  
xref: IWIS\_TRAITID:1116  
is\_a: CO\_321:0000122 ! fungal disease

[Term]

id: CO\_321:0000103  
name: flag smut  
def: "Scored for the plant response to the agent *Urocystis agropyri* causing flag smut disease." [CO:rs]  
xref: IWIS\_TRAITID:1096  
is\_a: CO\_321:0000136 ! smut

[Term]

id: CO\_321:0000104  
name: scab  
def: "Scored for the plant response to the agent *Fusarium* spp. causing wheat scab disease. Symptoms: Infected florets become slightly darkened and oily in appearance." [CO:rs]  
synonym: "FSCABG" RELATED []  
synonym: "fusarium head blight" RELATED []  
synonym: "scab grain resistance" RELATED []  
xref: IWIS\_TRAITID:1097  
is\_a: CO\_321:0000122 ! fungal disease

[Term]

id: CO\_321:0000105  
name: fusarium scab spike  
def: "Scored for the plant response to the agent *Calonectria nivalis* (*Fusarium nivale*) causing scab disease in spike." [CO:rs]  
synonym: "FSCABS" RELATED []  
xref: IWIS\_TRAITID:1089  
is\_a: CO\_321:0000104 ! scab

[Term]

id: CO\_321:0000106  
name: karnal bunt  
def: "Scored for the plant response to the agent *Tilletia indica* (syn. *Neovossia indica*) causing karnal bunt disease." [CO:rs]  
synonym: "TINDI" RELATED []  
xref: IWIS\_TRAITID:1091  
is\_a: CO\_321:0000098 ! bunt

[Term]

id: CO\_321:0000107  
name: leaf rust  
def: "Scored for the plant response to the agent *Puccinia recondita* causing leaf rust disease." [CO:rs]  
synonym: "PRECO" RELATED []  
xref: IWIS\_TRAITID:1073

is\_a: CO\_321:0000133 ! rust

[Term]

id: CO\_321:0000108  
name: loose smut  
def: "Scored for the plant response to the agent Ustilago tritici causing loose smut disease." [CO:rs]  
synonym: "UTRIT" RELATED []  
xref: IWIS\_TRAITID:1093  
is\_a: CO\_321:0000136 ! smut

[Term]

id: CO\_321:0000109  
name: nematode damage  
def: "Scored for the plant damage caused by nematodes." [CO:rs]  
synonym: "DMGNEM" RELATED []  
xref: IWIS\_TRAITID:1033  
xref: Gramene Plant Trait Ontology:TO\ :0000384  
is\_a: CO\_321:0000077 ! biotic stress trait

[Term]

id: CO\_321:0000110  
name: seed-gall nematode damage  
def: "Scored for the wheat seed-gall nematode damage caused by Anguina tritici." [CO:rs]  
xref: IWIS\_TRAITID:1102  
is\_a: CO\_321:0000109 ! nematode damage

[Term]

id: CO\_321:0000111  
name: cyst nematode damage  
def: "Scored for the wheat cyst nematode damage caused by cyst nematode, Heterodera avenae." [CO:rs]  
synonym: "cyst nematode" RELATED []  
synonym: "HAVEN" RELATED []  
xref: IWIS\_TRAITID:1103  
is\_a: CO\_321:0000109 ! nematode damage

[Term]

id: CO\_321:0000112  
name: *Pratylenchus neglectus* root-lesion nematode damage  
def: "Scored for the plant damage caused by root-lesion nematode, *Pratylenchus neglectus*." [CO:rs]  
synonym: "lesion nematode" RELATED []  
synonym: "PNEGL" RELATED []  
xref: IWIS\_TRAITID:1105  
is\_a: CO\_321:0000161 ! root-lesion nematode damage

[Term]

id: CO\_321:0000113  
name: *Pratylenchus thornei* root-lesion nematode damage

def: "Scored for the plant damage caused by root-lesion nematode, *Pratylenchus thornei*." [CO:rs]

synonym: "lesion nematode" RELATED

[<http://www.apsnet.org/online/common/names/wheat.asp>]

synonym: "PTHOR" RELATED []

xref: IWIS\_TRAITID:1104

is\_a: CO\_321:0000161 ! root-lesion nematode damage

[Term]

id: CO\_321:0000114

name: powdery mildew

def: "Scored for the plant response to the agent *Blumeria graminis* (*Erysiphe graminis*) f. sp. *tritici* wheat powdery mildew disease." [CO:rs]

[CO:rs]

synonym: "EGRAM" RELATED []

xref: IWIS\_TRAITID:1081

is\_a: CO\_321:0000122 ! fungal disease

[Term]

id: CO\_321:0000115

name: southern blight

def: "Scored for the plant response to the agent *Corticium rolfsii* (*Sclerotium rolfsii*) causing wheat southern blight disease." [CO:rs]

synonym: "sclerotium blight" RELATED []

synonym: "southern blight" RELATED []

synonym: "SROLF" RELATED []

xref: IWIS\_TRAITID:1115

is\_a: CO\_321:0000122 ! fungal disease

[Term]

id: CO\_321:0000116

name: spot blotch

def: "Scored for the plant response to the agent *Cochliobolus sativus* (*Helminthosporium sativum*)wheat spot blotch disease." [CO:rs]

synonym: "SNODO" RELATED []

synonym: "spot blotch" RELATED []

is\_a: CO\_321:0000134 ! blotch

[Term]

id: CO\_321:0000117

name: septoria tritici blotch

def: "Scored for the plant response to the agent *Mycosphaerella graminicola* (*Septoria tritici*)causing blotch disease. Symptoms: The lesions are linear and restricted laterally." [CO:rs]

synonym: "STRIT" RELATED []

xref: IWIS\_TRAITID:1075

is\_a: CO\_321:0000172 ! septoria blotch

[Term]

id: CO\_321:0000118

name: stem rust

def: "Scored for the plant response to the agent Puccinia graminis f.sp. tritici causing stem rust disease." [CO:rs]  
synonym: "PGRAM" RELATED []  
xref: IWIS\_TRAITID:1072  
is\_a: CO\_321:0000133 ! rust

[Term]

id: CO\_321:0000119  
name: take-all  
def: "Scored for the plant response to the agent Gaeumannomyces graminis var. tritici (Ggt) causing wheat take-all disease." [CO:rs]  
is\_a: CO\_321:0000122 ! fungal disease

[Term]

id: CO\_321:0000120  
name: bacterial leaf streak  
def: "Scored for the plant response to the agent Xanthomonas translucens causing bacterial leaf streak disease." [CO:rs]  
synonym: "black chaff" RELATED  
[<http://www.apsnet.org/online/common/names/wheat.asp>]  
synonym: "xanthomonas streak" RELATED  
[<http://www.apsnet.org/online/common/names/wheat.asp>]  
synonym: "XCUND" RELATED []  
xref: IWIS\_TRAITID:1080  
is\_a: CO\_321:0000137 ! bacterial disease

[Term]

id: CO\_321:0000121  
name: days to anthesis  
def: "Counted as days from sowing to 50% of the plants in flower. However, when planting in dry soils in dryland areas it is counted from the first day of rainfall or irrigation which is sufficient for germination." [CO:rs "ISBN:9290431891"]  
synonym: "ANTH, Anthes, DAYSAN" RELATED []  
synonym: "days to flower, anthesis" RELATED []  
xref: IWIS\_TRAITID:1149  
is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000122  
name: fungal disease  
def: "Scored for the plant response to the diseases caused by various fungi." [CO:rs]  
is\_a: CO\_321:0000077 ! biotic stress trait

[Term]

id: CO\_321:0000123  
name: harvest index  
def: "The ratio of grain weight to total plant weight." [CO:rs]  
synonym: "HARIDX" RELATED []  
xref: IWIS\_TRAITID:1161  
xref: Gramene Plant Trait Ontology:TO\ :0000128

is\_a: CO\_321:0000001 ! agronomic trait

[Term]

id: CO\_321:0000124

name: bread loaf volume

def: "Measurement of baking quality of flour." [CO:rs]

synonym: "LOFVOL" RELATED []

xref: IWIS\_TRAITID:1129

is\_a: CO\_321:0000003 ! quality trait

[Term]

id: CO\_321:0000125

name: fusarium leaf blotch

def: "Scored for the plant response to the agent *Calonectria nivalis* (*Fusarium nivale*) causing fusarium leaf blotch disease." [CO:rs]

synonym: "SNODON" RELATED []

synonym: "snow mold" RELATED []

is\_a: CO\_321:0000134 ! blotch

[Term]

id: CO\_321:0000126

name: hail damage

def: "Assessed in percentage for the plant damage caused by hail."

[CO:rs]

synonym: "DMGHAI" RELATED []

xref: IWIS\_TRAITID:1030

is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]

id: CO\_321:0000127

name: frost damage

def: "Assessed in percentage for the plant damage caused by frost."

[CO:rs]

synonym: "DMGFRO" RELATED []

xref: IWIS\_TRAITID:1031

is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]

id: CO\_321:0000128

name: waterlogging damage

def: "Assessed in percentage for the plant damage caused by waterlogging." [CO:rs]

synonym: "DMGH20" RELATED []

xref: IWIS\_TRAITID:1032

is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]

id: CO\_321:0000129

name: stripe rust

def: "Scored for the plant response to the agent *Puccinia striiformis* f.sp. *tritici* causing stripe rust disease." [CO:rs]

is\_a: CO\_321:0000133 ! rust

[Term]  
id: CO\_321:0000130  
name: stagonospora glume blotch  
def: "Scored for the plant response to the agent Leptosphaeria nodorum (Stagonospora nodorum, Septoria nodorum) causing stagonospora glume blotch. Symptoms: The lesions are lighter brown and often lens-shaped with a darker brown center." [CO:rs]  
synonym: "septoria nodorum blotch" RELATED []  
xref: IWIS\_TRAITID:1109  
is\_a: CO\_321:0000172 ! septoria blotch

[Term]  
id: CO\_321:0000131  
name: drought tolerance  
def: "Becoming tolerant to drought like conditions of minimal or no water content in the growth environment." [Gramene Plant Trait Ontology:TO\ :0000276]  
is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]  
id: CO\_321:0000132  
name: salinity tolerance  
def: "Tolerance to the high salt content in the growth medium." [Gramene Plant Trait Ontology:TO\ :0006001]  
synonym: "salt tolerance" RELATED []  
is\_a: CO\_321:0000076 ! abiotic stress trait

[Term]  
id: CO\_321:0000133  
name: rust  
def: "Scored for the plant response to the agent Puccinia spp. causing rust disease." [CO:rs]  
is\_a: CO\_321:0000122 ! fungal disease  
created\_by: RSHRESTHA  
creation\_date: 2009-06-03T04:25:00Z

[Term]  
id: CO\_321:0000134  
name: blotch  
def: "Scored for the plant response to several fungi causing leaf blotch disease. Symptoms: The lesions appear as tan to brown flecks, which expand into large, irregular, oval- or lens-shaped tan blotches with a yellow or chlorotic margin." [CO:rs]  
is\_a: CO\_321:0000122 ! fungal disease  
created\_by: RSHRESTHA  
creation\_date: 2009-06-03T04:29:17Z

[Term]  
id: CO\_321:0000135  
name: pyrenophora yellow leaf blotch

def: "Scored for the plant response to the agent *Pyrenophora trichostoma* (*Helminthosporium tritici-repentis*) causing *pyrenophora* yellow leaf blotch disease. Symptoms: The lesions appear as tan to brown flecks, which expand into large, irregular, oval- or lens-shaped tan blotches with a yellow or chlorotic margin." [CO:rs]  
synonym: "tan spot" RELATED []  
synonym: "yellow leaf spot" RELATED []  
is\_a: CO\_321:0000134 ! blotch  
created\_by: RSHRESTHA  
creation\_date: 2009-06-04T11:57:34Z

[Term]

id: CO\_321:0000136  
name: smut  
def: "Scored for the plant response to the agent *Ustilago* spp. causing wheat smut disease." [CO:rs]  
is\_a: CO\_321:0000122 ! fungal disease  
created\_by: RSHRESTHA  
creation\_date: 2009-06-04T02:22:40Z

[Term]

id: CO\_321:0000137  
name: bacterial disease  
def: "Scored for the plant response to the diseases caused by various bacteria." [CO:rs]  
xref: Gramene Plant Trait Ontology:TO\0000315  
is\_a: CO\_321:0000077 ! biotic stress trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-04T02:24:37Z

[Term]

id: CO\_321:0000138  
name: bacterial leaf blight  
def: "Scored for the plant response to the agent *Pseudomonas syringae* pv. *syringae* causing wheat bacterial leaf blight disease. Symptoms: Small\n(less than 0.04 inches) water-soaked lesions expand and eventually coalesce. Initial lesions become necrotic and turn from gray-green to tan-white. Entire leaves may become necrotic, but heads and glumes are typically symptomless." [CO:rs]  
is\_a: CO\_321:0000137 ! bacterial disease  
created\_by: RSHRESTHA  
creation\_date: 2009-06-04T02:28:44Z

[Term]

id: CO\_321:0000139  
name: viral disease  
def: "Scored for the plant response to the diseases caused by various virus." [CO:rs]  
xref: IWIS\_TRAITID:1101  
is\_a: CO\_321:0000077 ! biotic stress trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-04T02:52:27Z

[Term]  
id: CO\_321:0000140  
name: physiological trait  
def: "Describes important physiological characters of wheat." [CO:rs]  
relationship: part\_of CO\_321:0000000 ! CGIAR wheat trait ontology  
created\_by: RSHRESTHA  
creation\_date: 2009-06-04T04:51:05Z

[Term]  
id: CO\_321:0000141  
name: flag leaf area  
def: "Measured directly, or estimated as length and breadth of flag leaf usually of mother shoot and multiply by 0.7 in square centimeter." [CO:rs "personal communication with Matthew Reynolds, CIMMYT"]  
is\_a: CO\_321:0000140 ! physiological trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-09T10:55:47Z

[Term]  
id: CO\_321:0000142  
name: stomatal size  
def: "Measurement of stomata size in micrometers." [CO:rs]  
is\_a: CO\_321:0000140 ! physiological trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-09T11:01:19Z

[Term]  
id: CO\_321:0000143  
name: stomatal frequency  
def: "Number of stomata counted per unit area on the leaf surface." [CO:rs]  
xref: Gramene Plant Trait Ontology:TO\ :0000566  
is\_a: CO\_321:0000140 ! physiological trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-09T11:02:10Z

[Term]  
id: CO\_321:0000144  
name: alveograph dough strength  
def: "Determination of dough strength by alveograph." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T10:55:05Z

[Term]  
id: CO\_321:0000145  
name: alveograph tenacity to extensibility ratio

def: "A ratio of tenacity (p; maximum pressure required for the deformation of the sample) and extensibility (L; length of the curve) of dough." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T10:56:27Z

[Term]

id: CO\_321:0000146  
name: flour SDS-sedimentation  
def: "Testing of refined flour quality by SDS-sedimentation, a parameter estimating gluten strength or gluten protein quality." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T10:57:45Z

[Term]

id: CO\_321:0000147  
name: grain SDS-sedimentation  
def: "Testing of grain (whole meal flour) quality by SDS sedimentation a parameter estimating gluten strength or gluten protein quality." [CO:rs]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T10:58:47Z

[Term]

id: CO\_321:0000148  
name: starchy endosperm areas  
def: "Characterized for having low endosperm protein concentration." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:04:32Z

[Term]

id: CO\_321:0000149  
name: mixograph mixing time  
def: "Time required for the dough development from beginning of mixing flour and water to the dough reaches maximum consistency. It is expressed in minutes." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:06:46Z

[Term]

id: CO\_321:0000150  
name: high molecular weight glutenin subunit composition (HMW-Glu)

def: "Determination of high molecular weight of glutenin subunit composition in endosperm." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
comment: HMW glutenin subunits are essential for gluten elasticity and bread-making quality and Chinese noodle-making quality of wheat flour.  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:08:16Z

[Term]

id: CO\_321:0000151  
name: low molecular weight glutenin subunit composition (LMW-Glu)  
def: "Determination of low molecular weight of glutenin subunit composition in endosperm." [CO:rs]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:19:05Z

[Term]

id: CO\_321:0000152  
name: HMW-Glu 1A  
def: "Determination of high molecular weight of glutenin subunit 1A in endosperm." [CO:rs]  
is\_a: CO\_321:0000150 ! high molecular weight glutenin subunit composition (HMW-Glu)  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:33:58Z

[Term]

id: CO\_321:0000153  
name: HMW-Glu 1B  
def: "Determination of high molecular weight of glutenin subunit 1B in endosperm." [CO:rs]  
is\_a: CO\_321:0000150 ! high molecular weight glutenin subunit composition (HMW-Glu)  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:34:30Z

[Term]

id: CO\_321:0000154  
name: HMW-Glu 1D  
def: "Determination of high molecular weight of glutenin subunit 1D in endosperm." [CO:rs]  
is\_a: CO\_321:0000150 ! high molecular weight glutenin subunit composition (HMW-Glu)  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:34:50Z

[Term]

id: CO\_321:0000155  
name: LMW-Glu 1A

def: "Determination of low molecular weight of glutenin subunit 1A in endosperm." [CO:rs]  
is\_a: CO\_321:0000151 ! low molecular weight glutenin subunit composition (LMW-Glu)  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:35:34Z

[Term]  
id: CO\_321:0000156  
name: LMW-Glu 1B  
def: "Determination of low molecular weight of glutenin subunit 1B in endosperm." [CO:rs]  
is\_a: CO\_321:0000151 ! low molecular weight glutenin subunit composition (LMW-Glu)  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:36:03Z

[Term]  
id: CO\_321:0000157  
name: LMW-Glu 1D  
def: "Determination of high molecular weight of glutenin subunit 1D in endosperm." [CO:rs]  
is\_a: CO\_321:0000151 ! low molecular weight glutenin subunit composition (LMW-Glu)  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:36:17Z

[Term]  
id: CO\_321:0000158  
name: 1BL/1RS translocation  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T11:53:57Z

[Term]  
id: CO\_321:0000159  
name: test weight  
def: "The weight (Kg) per one hectoliter of clean grain." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T02:07:01Z

[Term]  
id: CO\_321:0000160  
name: sedimentation index  
def: "SDS-sedimentation volume divided by protein percentage." [CO:rs "personal communication with Javier Pena, CIMMYT"]  
is\_a: CO\_321:0000003 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2009-06-24T02:11:42Z

[Term]  
id: CO\_321:0000161  
name: root-lesion nematode damage  
def: "Scored for the plant damage caused by root-lesion nematodes, *Pratylenchus* spp." [CO:rs]  
is\_a: CO\_321:0000109 ! nematode damage  
created\_by: RSHRESTHA  
creation\_date: 2009-08-12T03:03:04Z

[Term]  
id: CO\_321:0000162  
name: cytology related trait  
def: "Describes cytological characters of wheat." [CO:rs]  
relationship: part\_of CO\_321:0000000 ! CGIAR wheat trait ontology  
created\_by: RSHRESTHA  
creation\_date: 2009-12-09T04:56:41Z

[Term]  
id: CO\_321:0000163  
name: chromosome number  
is\_a: CO\_321:0000162 ! cytology related trait  
created\_by: RSHRESTHA  
creation\_date: 2009-12-09T04:57:08Z

[Term]  
id: CO\_321:0000164  
name: winter response  
def: "Assessed in percentage for response to winter if winter kill or winter survival." [CO:rs]  
xref: IWIS\_TRAITID:1445  
xref: IWIS\_TRAITID:1446  
is\_a: CO\_321:0000076 ! abiotic stress trait  
creation\_date: 2010-11-05T08:53:36Z

[Term]  
id: CO\_321:0000165  
name: sterility index  
synonym: "sterile index" RELATED []  
xref: IWIS\_TRAITID:1325  
is\_a: CO\_321:0000001 ! agronomic trait  
creation\_date: 2010-11-05T09:00:34Z

[Term]  
id: CO\_321:0000166  
name: spike per meter square  
def: "Count numbers of spike per meter square area." [CO:rs]  
synonym: "spike/m2" RELATED []  
xref: IWIS\_TRAITID:1157  
is\_a: CO\_321:0000001 ! agronomic trait  
creation\_date: 2010-11-05T09:02:15Z

[Term]

id: CO\_321:0000167  
name: lodging incidence  
def: "Indicates percentage of plants that lodged." [CO:rs]  
is\_a: CO\_321:0000001 ! agronomic trait  
creation\_date: 2010-11-05T09:08:06Z

[Term]

id: CO\_321:0000168  
name: fusarium wilt  
def: "Scored for the plant response to the agent Fusarium oxysporum causing fusarium wilt disease." [CO:rs]  
xref: IWIS\_TRAITID:1113  
is\_a: CO\_321:0000122 ! fungal disease  
creation\_date: 2010-11-05T09:25:51Z

[Term]

id: CO\_321:0000169  
name: barley leaf rust  
xref: IWIS\_TRAITID:1381  
is\_a: CO\_321:0000122 ! fungal disease  
creation\_date: 2010-11-05T09:28:45Z

[Term]

id: CO\_321:0000170  
name: net blotch  
def: "Scored for the plant response to the agent Pyrenophora teres causing net blotch disease." [CO:rs]  
xref: IWIS\_TRAITID:1083  
is\_a: CO\_321:0000134 ! blotch  
creation\_date: 2010-11-05T09:30:23Z

[Term]

id: CO\_321:0000171  
name: barley scald  
def: "Scored for the plant response to the agent Rhynchosporium secalis causing barley scald disease." [CO:rs]  
synonym: "scald" RELATED []  
xref: IWIS\_TRAITID:1082  
is\_a: CO\_321:0000122 ! fungal disease  
creation\_date: 2010-11-05T09:48:45Z

[Term]

id: CO\_321:0000172  
name: septoria blotch  
def: "Scored for the plant response to the agent Septoria species causing septoria blotch disease." [CO:rs]  
synonym: "septoria species" RELATED []  
xref: IWIS\_TRAITID:1342  
is\_a: CO\_321:0000134 ! blotch  
creation\_date: 2010-11-05T09:54:58Z

[Term]

id: CO\_321:0000173  
name: soil borne mosaic  
def: "Scored for the plant response to the agent Soilborne Wheat Mosaic Virus (SBWMV) which is vectored by plasmodiophorid Polymyxa graminis causing soil borne mosaic disease." [CO:rs]  
xref: IWIS\_TRAITID:1440  
is\_a: CO\_321:0000139 ! viral disease  
creation\_date: 2010-11-05T09:57:34Z

[Term]

id: CO\_321:0000174  
name: yellow berry  
def: "Refers to kernels showing chalky or starchy endosperm areas." [CO:rs]  
xref: IWIS\_TRIATID:1128  
is\_a: CO\_321:0000003 ! quality trait  
creation\_date: 2010-11-05T10:13:17Z

[Term]

id: CO\_321:0000175  
name: leaf tip necrosis  
def: "A physiological phenomenon caused by hot, dry and windy weather. The whole tip of the flag leaf tends to be necrotic and will often fold over. Leaf tip necrosis progresses from the margins of the flag leaf tip and lower leaves as well show some signs of it. Leaf tip necrosis is observed to some extent in all wheat varieties containing the leaf rust gene resistance gene Lr34." [CO:rs]  
is\_a: CO\_321:0000140 ! physiological trait  
creation\_date: 2010-11-08T10:24:37Z

[Typedef]

id: part\_of  
name: part\_of  
is\_transitive: true  
creation\_date: 2011-03-04T12:11:38Z