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remark: Maize trait ontology is prepared by Rosemary Shrestha, CIMMYT  
for the Generation Challenge Program (GCP).

[Term]

id: CO\_322:0000000  
name: CGIAR maize trait ontology  
def: "This ontology defines traits of the International Maize  
Information System (IMIS) database, CIMMYT and the Descriptors for  
maize published by CIMMYT/IBPGR, Rome 1991 (ISBN 9290431891)." [CO:rs]

[Term]

id: CO\_322:0000001  
name: anthesis silking interval  
def: "A difference of the average number of days between the maize  
tassel flowering and the first visible silk (stigma) on the maize  
ear." [CO:rs "Bänziger, M., G.O. Edmeades, D. Beck, and M. Bellon.  
2000. Breeding for Drought and Nitrogen Stress Tolerance in Maize:  
From Theory to Practice. Mexico, D.F.: CIMMYT"]  
comment: If it is measured under drought or N stress, small or  
negative values indicate stress tolerance. Unit/precision : 1 day.  
synonym: "ASI, ANTSKIT, FLWSLKINTER" RELATED []  
xref: Gramene Plant Trait Ontology:TO\ :0000463  
xref: IMIS\_TRAITID:2004  
is\_a: CO\_322:0000002 ! agronomic trait  
is\_a: CO\_322:0000023 ! phenological trait  
relationship: derived\_from CO\_322:0000030 ! days to anthesis  
relationship: derived\_from CO\_322:0000031 ! days to silking

[Term]

id: CO\_322:0000002  
name: agronomic trait  
relationship: part\_of CO\_322:0000000 ! CGIAR maize trait ontology

[Term]

id: CO\_322:0000003  
name: chlorophyll content  
def: "Measurement of chlorophyll amount in green tissue of plant or  
plant part." [CO:rs]  
synonym: "CHLCN, CHLO" RELATED []  
xref: Gramene Plant Trait Ontology:TO\ :0000495  
xref: IMIS\_TRAITID:2058  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000004  
name: female flowering

def: "Traits associated with the timing of the female flowering."  
[CO:rs]  
synonym: "female flowering anthesis" RELATED []  
xref: Gramene Plant Trait Ontology:TO\0000359  
is\_a: CO\_322:0000023 ! phenological trait

[Term]  
id: CO\_322:0000005  
name: grain yield  
def: "Shelled grain weight per plot adjusted to 12.5% grain moisture and converted to tons per hectare." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]  
comment: 80 % shelling percentage is assumed when ear weight reported.  
synonym: "GRYLD, GY, seed yield" RELATED []  
xref: Gramene Plant Trait Ontology:TO\0000396  
xref: IMIS\_TRAITID:2034  
xref: IMIS\_TRAITID:2035  
xref: IMIS\_TRAITID:2090  
xref: IMIS\_TRAITID:2091  
xref: IMIS\_TRAITID:2098  
is\_a: CO\_322:0000176 ! agronomic harvest trait

[Term]  
id: CO\_322:0000006  
name: physiological trait  
synonym: "SOI" RELATED []  
relationship: part\_of CO\_322:0000000 ! CGIAR maize trait ontology

[Term]  
id: CO\_322:0000007  
name: plant height  
def: "Height between the base of a plant to the insertion of the first tassel branch of the same plant." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]  
synonym: "PHT, PlantH, PHT, shoot height" RELATED []  
xref: Gramene Plant Trait Ontology:TO\0000207  
xref: IMIS\_TRAITID:2050  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000008  
name: plant number  
def: "Number of plants per plot." [CO:rs]  
synonym: "PNO" RELATED []  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000009  
name: male flowering  
def: "Traits associated with the timing of the male flowering."  
[CO:rs]  
synonym: "male flower anthesis" RELATED []

xref: Gramene Plant Trait Ontology:TO\0000365  
is\_a: CO\_322:0000023 ! phenological trait

[Term]

id: CO\_322:0000010  
name: kernel number  
def: "Calculated as grain weight divided by single kernel weight."  
[CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]  
synonym: "grain number, GRNB, KNO" RELATED []  
xref: Gramene Plant Trait Ontology:TO\0002759  
is\_a: CO\_322:0000176 ! agronomic harvest trait

[Term]

id: CO\_322:0000011  
name: plant aspect  
def: "Qualitative score of the visual appeal (ideotype) of the plant. In another word, it rates characteristics such as plant and ear height, uniformity of plants and ears, total numbers of harvested ear, disease and insect damage, and lodging." [CO:rs "personal communication with Kevin Pixley, CIMMYT"]  
synonym: "PlantA" RELATED []  
xref: IMIS\_TRAITID:2049  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]

id: CO\_322:0000012  
name: senescence  
def: "A visual rating of dead leaf area." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]  
comment: If taken under drought or N stress, small scores indicate stress tolerance. Leaf senescence is scored on 2 occasions (20 and 30 days after female flowering).  
synonym: "SEN, Senesc" RELATED []  
xref: IMIS\_TRAITID:2057  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]

id: CO\_322:0000013  
name: silk length  
def: "Measurement of silk length." [CO:rs]  
synonym: "SG" RELATED []  
is\_a: CO\_322:0000174 ! morphological trait

[Term]

id: CO\_322:0000014  
name: silk growth rate  
def: "Measurement of growth rate of silk." [CO:rs]  
synonym: "SGR" RELATED []  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]

id: CO\_322:0000015

name: ear length  
def: "Measurement of ear length." [CO:rs]  
synonym: "EG" RELATED []  
is\_a: CO\_322:0000174 ! morphological trait

[Term]  
id: CO\_322:0000016  
name: ear growth rate  
def: "Measure of growth rate of ear in percentage." [CO:rs]  
synonym: "EGR" RELATED []  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000017  
name: ear height  
def: "Measurement of the height between the base of a plant to the insertion of the top (uppermost) ear of the same plant." [CO:rs  
"personal communication with Vivek Bindiganavile, CIMMYT"]  
synonym: "EarHei, EARHT, EHT" RELATED []  
xref: Gramene Plant Trait Ontology:TO\ :0000683  
xref: IMIS\_TRAITID:2023  
is\_a: CO\_322:0000174 ! morphological trait

[Term]  
id: CO\_322:0000018  
name: ear aspect  
def: "A visual qualitative rating of the harvested ears." [CO:rs]  
synonym: "EarAsp" RELATED []  
xref: IMIS\_TRAITID:2022  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000019  
name: ear leaf length  
def: "Measurement of length ear leaf (blade)." [CO:rs]  
synonym: "ELL" RELATED []  
is\_a: CO\_322:0000174 ! morphological trait

[Term]  
id: CO\_322:0000020  
name: ear position  
def: "A ratio of ear height to plant height. Small values indicate low ear position; large values indicate high ear position." [CO:rs]  
synonym: "EPO" RELATED []  
xref: IMIS\_TRAITID:2024  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000021  
name: ear number per plant  
def: "Number of ears per plant." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]

synonym: "ears per plant" RELATED []  
synonym: "ENO, EPPNo" RELATED []  
xref: IMIS\_TRAITID:2031  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000022  
name: ear dry weight  
def: "Weight of dried ear." [CO:rs "personal communication with Jose Luis Araus, CIMMYT"]  
synonym: "EDWOD" RELATED []  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000023  
name: phenological trait  
relationship: part\_of CO\_322:0000000 ! CGIAR maize trait ontology

[Term]  
id: CO\_322:0000024  
name: young leaf chlorophyll content  
def: "Amount of chlorophyll content in the young leaf measured at the beginning and the end of the stress using a SPAD meter." [CO:rs]  
comment: Chlorophyll content measured in the middle of the target leaf.  
synonym: "YLCH" RELATED []  
is\_a: CO\_322:0000003 ! chlorophyll content

[Term]  
id: CO\_322:0000025  
name: leaf length  
synonym: "YLL" RELATED []  
is\_a: CO\_322:0000174 ! morphological trait

[Term]  
id: CO\_322:0000026  
name: leaf width  
synonym: "YLW" RELATED []  
is\_a: CO\_322:0000174 ! morphological trait

[Term]  
id: CO\_322:0000027  
name: tassel branches dry weight  
def: "The dry weight of tassel branches (grams) just prior to pollen shed." [CO:rs]  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000028  
name: tassel branches number  
def: "Number of branches on tassel." [CO:rs]  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000029  
name: quality trait  
relationship: part\_of CO\_322:0000000 ! CGIAR maize trait ontology

[Term]  
id: CO\_322:0000030  
name: days to anthesis  
def: "Number of days from sowing to when 50% of the plants shed pollen." [CO:rs "ISBN:9290431891"]  
synonym: "days to tasseling" RELATED []  
xref: IMIS\_TRAITID:2001  
is\_a: CO\_322:0000009 ! male flowering

[Term]  
id: CO\_322:0000031  
name: days to silking  
def: "Number of days from sowing to when 50% of the plants silk." [CO:rs "ISBN:9290431891"]  
synonym: "DTSLK" RELATED []  
synonym: "silk date" RELATED []  
synonym: "silking date" RELATED []  
xref: Gramene Plant Trait Ontology:TO\:0000658  
xref: IMIS\_TRAITID:2018  
is\_a: CO\_322:0000004 ! female flowering

[Term]  
id: CO\_322:0000032  
name: days to maturity  
def: "Number of days required from seeding to seed/grain ripening." [Gramene Plant Trait Ontology:TO\:0000469]  
synonym: "DTMT, Maturi" RELATED []  
xref: IMIS\_TRAITID:2096  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000033  
name: grain moisture  
def: "Moisture content in grain, usually measured at harvest." [CO:rs]  
synonym: "GrainM" RELATED []  
xref: Gramene Plant Trait Ontology:TO\:0000057  
xref: IMIS\_TRAITID:2032  
is\_a: CO\_322:0000176 ! agronomic harvest trait

[Term]  
id: CO\_322:0000034  
name: root lodging  
def: "A visual rating of plants leaning from the vertical due to root lodging." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]

comment: Counted late in the grain filling period or two weeks before harvest or just prior to harvest.  
synonym: "Rlodg, RootLo" RELATED []  
xref: IMIS\_TRAITID:2055  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000035  
name: stem lodging  
def: "A visual rating of plants broken from ground level to the top ear node." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]  
synonym: "Slodg, StemLo" RELATED []  
synonym: "stalk lodging" RELATED []  
xref: IMIS\_TRAITID:2063  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000036  
name: growing degree units to anthesis  
def: "Heat units (growing-degree units) between planting and 50% anthesis." [CO:rs]  
synonym: "Anthesis GDU" RELATED []  
xref: IMIS\_TRAITID:2073  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000037  
name: growing degree units to maturity  
def: "Heat units (growing-degree units) between planting and black-layer formation, commercial model (10,30)." [CO:rs]  
synonym: "maturity GDU" RELATED []  
xref: IMIS\_TRAITID:2097  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000038  
name: tassel size  
def: "A visual rating of tassel size after milk stage. The higher the rating the larger the tassel." [CO:rs]  
xref: IMIS\_TRAITID:2122  
is\_a: CO\_322:0000174 ! morphological trait

[Term]  
id: CO\_322:0000039  
name: grain texture  
def: "A measure of the variation of the intensity of a surface, quantifying properties such as smoothness, coarseness and regularity of the grain." [CO:rs]  
synonym: "GrainT" RELATED []  
xref: IMIS\_TRAITID:2033  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000040  
name: seed viability  
def: "Measurement of germinability of seeds." [CO:rs]  
synonym: "SDVIA, SeedVi" RELATED []  
xref: Gramene Plant Trait Ontology:TO\ :0000345  
xref: IMIS\_TRAITID:2115  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000041  
name: endosperm hardness  
def: "Measurement of quality of endosperm usually rated on a scale 1-5 where 1, hard and transparent grains; 5, soft and opaque grains." [CO:rs]  
synonym: "Endosp" RELATED []  
xref: IMIS\_TRAITID:2030  
is\_a: CO\_322:0000029 ! quality trait

[Term]  
id: CO\_322:0000042  
name: stress trait  
relationship: part\_of CO\_322:0000000 ! CGIAR maize trait ontology

[Term]  
id: CO\_322:0000043  
name: abiotic stress trait  
is\_a: CO\_322:0000042 ! stress trait

[Term]  
id: CO\_322:0000044  
name: biotic stress trait  
is\_a: CO\_322:0000042 ! stress trait

[Term]  
id: CO\_322:0000045  
name: bacterial disease  
def: "Scored for the response to the diseases caused by several bacteria." [CO:rs]  
is\_a: CO\_322:0000044 ! biotic stress trait

[Term]  
id: CO\_322:0000046  
name: fungal disease  
def: "Scored for the response to the diseases caused by several fungi." [CO:rs]  
is\_a: CO\_322:0000044 ! biotic stress trait

[Term]  
id: CO\_322:0000047  
name: viral disease

def: "Scored for the response to the diseases caused by several viruses." [CO:rs]  
is\_a: CO\_322:0000044 ! biotic stress trait

[Term]

id: CO\_322:0000048  
name: insect damage  
def: "Scored for the response to the damages caused by insects." [CO:rs]  
[CO:rs]  
is\_a: CO\_322:0000044 ! biotic stress trait

[Term]

id: CO\_322:0000049  
name: corn stunt  
def: "Scored for the plant response to the agents corn stunt spiroplasma or maize bushy stunt phytoplasma [mycoplasma], maize rayado fino virus causing corn stunt complex disease." [CO:rs]  
comment: Symptoms: Stunting, shortened internodes; axillary bud development; excessive root branching; leaf reddening and/or marginal yellowing, chlorotic streaks at bases of leaves.  
synonym: "corn stunt spiroplasma" RELATED []  
synonym: "CornSt" RELATED []  
xref: IMIS\_TRAITID:2014  
xref: IMIS\_TRAITID:2015  
is\_a: CO\_322:0000045 ! bacterial disease

[Term]

id: CO\_322:0000050  
name: stewarts wilt  
def: "Scored for the plant response to the agent Erwinia stewartii causing stewart's wilt disease." [CO:rs "ISBN:9706481095"]  
comment: Symptoms: Stunting, shortened internodes; axillary bud development; excessive root branching; leaf reddening and/or marginal yellowing, chlorotic streaks at bases of leaves.  
synonym: "bacterial wilt" RELATED  
[<http://www.apsnet.org/online/common/names/corn.asp>]  
synonym: "StewartsWiltPer" RELATED []  
xref: IMIS\_TRAITID:2120  
is\_a: CO\_322:0000045 ! bacterial disease

[Term]

id: CO\_322:0000051  
name: bacterial leaf stripe  
def: "Scored for the plant response to the agent Pseudomonas rubrilinians causing bacterial leaf stripe disease." [CO:rs]  
comment: Symptoms: Lesions, pale green along veins developing to stripes, later becoming grayish white to brown and shredding.  
synonym: "bactrialLeafStripe1\_5" RELATED []  
xref: IMIS\_TRAITID:2075  
is\_a: CO\_322:0000045 ! bacterial disease

[Term]

id: CO\_322:0000052  
name: bacterial stalk rot  
def: "Scored for the plant response to the agent Erwinia chrysanthemi causing bacterial stalk rot disease." [CO:rs]  
comment: Symptoms: Water-soaked, dark areas at base of stalk; unpleasant odor, lodging.  
xref: IMIS\_TRAITID:2116  
is\_a: CO\_322:0000045 ! bacterial disease

[Term]

id: CO\_322:0000053  
name: maize bushy stunt  
def: "Scored for the plant response to the agent mycoplasma like organism, MLO causing maize bushy stunt disease." [CO:rs]  
comment: Symptoms: Chlorotic and reddish leaves; stunting; plant may be bushy with many tillers.  
synonym: "maizeB" RELATED []  
xref: IMIS\_TRAITID:2045  
is\_a: CO\_322:0000045 ! bacterial disease

[Term]

id: CO\_322:0000054  
name: rust  
def: "Scored for the plant response to the multiple agents causing rust disease." [CO:rs]  
synonym: "rust" RELATED []  
xref: IMIS\_TRAITID:2113  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000055  
name: polysora rust  
def: "Scored for the plant response to the agent Puccinia polysora (in lowlands) causing Polysora rust disease." [CO:rs]  
comment: Symptoms: Pustules, small, round, powdery light orange; later, turning black.  
synonym: "Polyso, rust" RELATED []  
synonym: "southern rust" RELATED []  
xref: IMIS\_TRAITID:2052  
is\_a: CO\_322:0000054 ! rust

[Term]

id: CO\_322:0000056  
name: tropical rust  
def: "Scored for the plant response to the agent Physopella zeae causing tropical rust disease." [CO:rs]  
comment: Symptoms: Pustules, small, round- to-oval, surrounded by black rim.  
synonym: "Tropic" RELATED []  
xref: IMIS\_TRAITID:2067  
is\_a: CO\_322:0000054 ! rust

[Term]  
id: CO\_322:0000057  
name: maydis leaf blight  
def: "Scored for the plant response to the agent Bipolaris maydis (Helminthosporium maydis) causing maydis leaf blight disease." [CO:rs]  
comment: Symptoms: Lesions, small, light brown in color, elongating along secondary veins, and often coalescing.  
synonym: "LeafBl; SCBL" RELATED []  
synonym: "southern corn leaf blight" RELATED []  
xref: IMIS\_TRAITID:2041  
is\_a: CO\_322:0000046 ! fungal disease

[Term]  
id: CO\_322:0000058  
name: anthracnose leaf blight  
def: "Scored for the plant response to the agent Colletotrichum graminicola causing anthracnose leaf blight disease." [CO:rs]  
synonym: "ANTHRA" RELATED []  
synonym: "anthracnose stalk rot" RELATED []  
xref: IMIS\_TRAITID:2074  
is\_a: CO\_322:0000046 ! fungal disease

[Term]  
id: CO\_322:0000059  
name: tillering index  
def: "Number of tillers per plant." [CO:rs "ISBN:9290431891"]  
comment: Average of more than 20 representative plants. \nAt growth stage: at flowering.  
is\_a: CO\_322:0000002 ! agronomic trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T10:57:34Z

[Term]  
id: CO\_322:0000060  
name: black bundle  
def: "Scored for the plant response to the agent Acremonium strictum causing Black bundle disease." [CO:rs]  
comment: Symptoms: Nubbins, or ears with underdeveloped, shrunken kernels.  
synonym: "BlackBundlediseasePer" RELATED []  
xref: IMIS\_TRAITID:2076  
is\_a: CO\_322:0000046 ! fungal disease

[Term]  
id: CO\_322:0000061  
name: stalk rot  
def: "Scored for the plant response to multiple agents causing stalk rot disease." [CO:rs]  
synonym: "StalkR" RELATED []  
xref: IMIS\_TRAITID:2060  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000062  
name: charcoal rot  
def: "Scored for the plant response to the agent *Macrophomina phaseolina* causing charcoal rot disease." [CO:rs]  
comment: Symptoms: Black discoloration of stem; shredding of interior; bundles of black material. In leaf, firing of upper leaves beginning at tasseling. Lightweight, chaffy ears; loose, discolored kernels, black specks on kernels and cob resulted due to charcoal rot in ear.  
synonym: "CharcoalRotPer" RELATED []  
xref: IMIS\_TRAITID:2078  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000063  
name: fusarium stalk rot  
def: "Scored for the plant response to the agent *Fusarium* spp. causing fusarium stalk rot disease." [CO:rs]  
comment: Symptoms: The symptoms produced by *Fusarium* spp. resemble to those caused by *Stenocarpella* or *Cephalosporium*, and cannot be differentiated until spore-producing structures are observed. Wilted plants remain standing when dry, and small, dark-brown lesions develop in the lowest internodes. When infected stalks are split, the phloem appears dark brown, and there is a general conspicuous browning of tissues. In the final stages of infection, pith is shredded and surrounding tissues become discolored.  
is\_a: CO\_322:0000061 ! stalk rot

[Term]

id: CO\_322:0000064  
name: fusarium moniliforme stalk rot  
def: "Scored for the plant response to the agent *Fusarium moniliforme* causing fusarium stalk rot disease." [CO:rs]  
synonym: "StalkRotFusMoniPer" RELATED []  
xref: IMIS\_TRAITID:2117  
is\_a: CO\_322:0000063 ! fusarium stalk rot

[Term]

id: CO\_322:0000065  
name: fusarium graminearum stalk rot  
def: "Scored for the plant response to the agent *Fusarium graminearum* causing *Fusarium* stalk rot disease." [CO:rs]  
synonym: "StalkRotFusGram" RELATED []  
xref: IMIS\_TRAITID:2059  
xref: IMIS\_TRAITID:2102  
is\_a: CO\_322:0000063 ! fusarium stalk rot

[Term]

id: CO\_322:0000066  
name: stenocarpella stalk rot  
def: "Scored for the plant response to the agent *Stenocarpella* (=Diplodia) causing stenocarpella stalk rot disease." [CO:rs]

comment: Symptoms: Broken stalks; brownish pith; later, abundant spore-producing structures.  
synonym: "StalkRotStenocarPer" RELATED []  
xref: IMIS\_TRAITID:2118  
is\_a: CO\_322:0000061 ! stalk rot

[Term]

id: CO\_322:0000067  
name: pythium stalk rot  
def: "Scored for the plant response to the agent (Pythium spp.) causing pythium stalk rot disease." [CO:rs]  
comment: Twisting; dark internodes, soft and water soaked; lodging.  
synonym: "StalkRotPythiumPer" RELATED []  
xref: IMIS\_TRAITID:2061  
is\_a: CO\_322:0000061 ! stalk rot

[Term]

id: CO\_322:0000068  
name: ear rot  
def: "Percentage of the ears that are rotten." [CO:rs]  
synonym: "ear rot total" RELATED []  
xref: IMIS\_TRAITID:2028  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000069  
name: fusarium ear rot  
def: "Scored for the plant response to the agent Fusarium spp. causing fusarium ear rot disease." [CO:rs]  
synonym: "EarRot" RELATED []  
is\_a: CO\_322:0000068 ! ear rot

[Term]

id: CO\_322:0000070  
name: fusarium graminearum ear rot  
def: "Scored for the plant response to the agent Fusarium graminearum causing ear rot disease." [CO:rs]  
synonym: "EarRot" RELATED []  
xref: IMIS\_TRAITID:2085  
is\_a: CO\_322:0000069 ! fusarium ear rot

[Term]

id: CO\_322:0000071  
name: fusarium moniliforme ear rot  
def: "Scored for the plant response to the agent Fusarium moniliforme causing ear rot disease." [CO:rs]  
comment: Symptoms: Cottony, white-to-pink growth; some germination on the cob; white streaks on the pericarp; scattered kernels on the ear with pink fungal growth.  
synonym: "EarRot" RELATED []  
xref: IMIS\_TRAITID:2026  
is\_a: CO\_322:0000069 ! fusarium ear rot

[Term]

id: CO\_322:0000072  
name: aspergillus ear rot  
def: "Scored for the plant response to the agent Aspergillus flavus causing aspergillus ear rot disease." [CO:rs]  
comment: Symptoms: Damaged kernels with black, yellow-green, ivy green or whitish, powdery spore masses.  
synonym: "EarRot" RELATED []  
xref: IMIS\_TRAITID:2005  
xref: IMIS\_TRAITID:2006  
xref: IMIS\_TRAITID:2025  
is\_a: CO\_322:0000068 ! ear rot

[Term]

id: CO\_322:0000073  
name: stenocarpella ear rot  
def: "Scored for the plant response to the agent Stenocarpella (=Diplodia) causing ear rot disease." [CO:rs]  
comment: Symptoms: White fungal growth; gray-brown ear; black pycnidia; husks adhering to ear.  
synonym: "Diplodia ear rot, EarRot, white ear rot" RELATED []  
xref: IMIS\_TRAITID:2027  
is\_a: CO\_322:0000068 ! ear rot

[Term]

id: CO\_322:0000074  
name: penicillium ear rot  
def: "Scored for the plant response to the agent Penicillium spp. causing ear rot disease." [CO:rs]  
comment: Symptoms: Blue-green powder on cob; streaked and bleached kernels.  
synonym: "EarRot" RELATED []  
xref: IMIS\_TRAITID:2086  
is\_a: CO\_322:0000068 ! ear rot

[Term]

id: CO\_322:0000075  
name: downy mildew  
def: "Scored for the plant response to the species of the genera Peronosclerospora, Sclerospora, and Sclerophthora causing downy mildews disease." [CO:rs "ISBN:9706481095"]  
comment: Symptoms: Downy growth on upper or lower leaf surface, striping, partial leaf symptom or general chlorosis; narrow, abnormally erect leaves.  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000076  
name: philippine downy mildew

def: "Scored for the plant response to the agent Peronosclerospora philippinensis causing philippine downy mildew disease." [CO:rs "ISBN:9706481095"]  
synonym: "DMPPhilippinePer" RELATED []  
xref: IMIS\_TRAITID:2083  
is\_a: CO\_322:0000075 ! downy mildew

[Term]

id: CO\_322:0000077  
name: sugarcane downy mildew  
def: "Scored for the plant response to the agent Peronosclerospora sacchari causing sugarcane downy mildew disease." [CO:rs "ISBN:9706481095"]  
synonym: "DMSugarcanePer" RELATED []  
xref: IMIS\_TRAITID:2084  
is\_a: CO\_322:0000075 ! downy mildew

[Term]

id: CO\_322:0000078  
name: brown stripe downy mildew  
def: "Scored for the plant response to the agent Sclerophthora rayssiae var. zae causing brown stripe downy mildew disease." [CO:rs]  
synonym: "DMBrow" RELATED []  
xref: IMIS\_TRAITID:2082  
is\_a: CO\_322:0000075 ! downy mildew

[Term]

id: CO\_322:0000079  
name: java downy mildew  
def: "Scored for the plant response to the agent Peronosclerospora maydis causing java downy mildew disease." [CO:rs]  
synonym: "DMJava" RELATED []  
xref: IMIS\_TRAITID:2019  
is\_a: CO\_322:0000075 ! downy mildew

[Term]

id: CO\_322:0000080  
name: sorghum downy mildew  
def: "Scored for the plant response to the agent Peronosclerospora sorghi causing sorghum downy mildew disease." [CO:rs "ISBN:9706481095"]  
synonym: "DMSorg" RELATED []  
xref: IMIS\_TRAITID:2020  
xref: IMIS\_TRAITID:2021  
is\_a: CO\_322:0000075 ! downy mildew

[Term]

id: CO\_322:0000081  
name: crazy top downy mildew  
def: "Scored for the plant response to the agent Sclerophthora macrospora causing crazy top disease." [CO:rs]  
synonym: "CrazyT" RELATED []

xref: IMIS\_TRAITID:2016  
is\_a: CO\_322:0000075 ! downy mildew

[Term]

id: CO\_322:0000082  
name: common smut  
def: "Scored for the plant response to the agent *Ustilago maydis* (syn. *U. zeae*) causing common smut." [CO:rs "ISBN:9706481095"]  
comment: Symptoms: White galls, closed replacing kernels; later, black spore masses.  
synonym: "common" RELATED []  
xref: IMIS\_TRAITID:2013  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000083  
name: head smut  
def: "Scored for the plant response to the agent *Sphacelotheca reiliana* causing head smut disease." [CO:rs]  
comment: Symptoms: Malformation and enlargement in tassels; black masses of spores that develop inside individual male florets.  
synonym: "HeadSm" RELATED []  
xref: IMIS\_TRAITID:2038  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000084  
name: banded leaf and sheath blight  
def: "Scored for the plant response to the agent *Rhizoctonia solani* f. sp. *sasakii* causing banded leaf and sheath blight disease." [CO:rs]  
comment: Symptoms: Spots, concentric, on leaves and sheaths; filamentous masses develop on lesions.  
synonym: "BandLe" RELATED []  
xref: IMIS\_TRAITID:2008  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000085  
name: common rust  
def: "Scored for the plant response to the agent *Puccinia sorghi* (In highlands and mid altitude) causing common rust disease." [CO:rs]  
comment: Pustules, small, elongate, powdery, dark brown; later, turning black.  
synonym: "common" RELATED []  
xref: IMIS\_TRAITID:2012  
is\_a: CO\_322:0000054 ! rust

[Term]

id: CO\_322:0000086  
name: brown spot  
def: "Scored for the plant response to the agent *Physoderma maydis* causing brown spot disease." [CO:rs]

comment: Symptoms: Brown lesions; rotting.  
synonym: "BrownS" RELATED []  
xref: IMIS\_TRAITID:2010  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000087  
name: leaf spot  
def: "Scored for the plant response to the several fungi causing leaf spot disease." [CO:rs "ISBN:9706481095"]  
comment: Symptoms: Lesions, with brown centers, about 2 mm in diameter. Spots, small and necrotic, with light colored halos.  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000088  
name: gray leaf spot  
def: "Scored for the plant response to the agent Cerospora zeae-maydis causing gray leaf spot disease." [CO:rs]  
comment: Symptoms: Lesions, beginning as small, regular, elongated brownish gray necrotic spots, and growing parallel to the veins.  
synonym: "GrayLe" RELATED []  
xref: IMIS\_TRAITID:2036  
is\_a: CO\_322:0000087 ! leaf spot

[Term]

id: CO\_322:0000089  
name: curvularia leaf spot  
def: "Scored for the plant response to the agent Curvularia spp. causing curvularia leaf spot disease." [CO:rs]  
synonym: "curvularia leaf spot" RELATED []  
xref: IMIS\_TRAITID:2017  
is\_a: CO\_322:0000087 ! leaf spot

[Term]

id: CO\_322:0000090  
name: phaeosphaeria leaf spot  
def: "Scored for the plant response to the agent Phaeosphaeria maydis causing phaeosphaeria leaf spot disease." [CO:rs]  
comment: Symptoms: Spots, small and pale green, round to slightly elongate later becoming bleached, then necrotic, with a dark brown margin.  
synonym: "Phaesl" RELATED []  
synonym: "PhaesLeafSpot" RELATED []  
xref: IMIS\_TRAITID:2048  
is\_a: CO\_322:0000087 ! leaf spot

[Term]

id: CO\_322:0000091  
name: tarspot complex  
def: "Scored for the plant response to the agent Phyllachora maydis (Monographella maydis) causing tarspot complex disease." [CO:rs]

comment: Symptoms: Spots, shiny, raised and black; later with necrosis coalescing and drying foliage.  
synonym: "TarspotComplex1\_5" RELATED []  
xref: IMIS\_TRAITID:2066  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000092  
name: turcicum leaf blight  
def: "Scored for the plant response to the agent Exserohilum turcicum (Helminthosporium turcicum) causing turcicum leaf blight disease."  
[CO:rs]  
comment: Symptoms: Lesions, elongated, spindle-shaped, and necrotic; may coalesce to burn plant.  
synonym: "NCBL, TLB" RELATED []  
synonym: "northern corn leaf blight" RELATED []  
xref: IMIS\_TRAITID:2042  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000093  
name: seedling disease  
def: "Seedling disease measured as percentage of plants affected."  
[CO:rs]  
xref: IMIS\_TRAITID:2114  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000094  
name: mal de rio cuarto virus  
def: "Scored for the plant response to the viral agent causing Mal de rio cuarto virus (MRCV) disease." [CO:rs "ISBN:9706481095"]  
comment: Mal de Rio Cuarto Virus has been reported from central Argentina and Uruguay affecting maize production.  
xref: IMIS\_TRAITID:2129  
is\_a: CO\_322:0000047 ! viral disease

[Term]

id: CO\_322:0000095  
name: maize rayado fino virus  
def: "Scored for the plant response to the viral agent causing Maize rayado fino virus (MRFV)disease." [CO:rs "ISBN:9706481095"]  
comment: Symptoms: Small, isolated chlorotic spots easily observed by holding leaves against the light. Later, the spots become more numerous and fuse, forming 5 to 10 cm stripes that advance along the veins. Poor grain set and grain filling are observed with infection at the seedling stage.  
synonym: "Maize fine stripe virus disease" RELATED [ISBN:9706481095]  
synonym: "MRFV" RELATED  
[<http://www.apsnet.org/online/common/names/corn.asp>]  
synonym: "VirusMaizeRayadoFinoPer" RELATED []  
xref: IMIS\_TRAITID:2125

is\_a: CO\_322:0000047 ! viral disease

[Term]

id: CO\_322:0000096

name: maize mosaic virus

def: "Scored for the plant response to the viral agent causing maize mosaic virus (MMV) disease." [CO:rs "ISBN:9706481095"]

comment: Symptoms: Striping, chlorotic; leaves appear crowded and erect; leaves rough, fleshy, dark purple.

synonym: "MMV" RELATED

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

synonym: "VirusMaizeMosaicPer" RELATED []

xref: IMIS\_TRAITID:2124

is\_a: CO\_322:0000047 ! viral disease

[Term]

id: CO\_322:0000097

name: maize rough dwarf virus

def: "Scored for the plant response to the viral agent causing maize rough dwarf virus (MRDV) disease." [CO:rs "ISBN:9706481095"]

comment: Symptoms: Infected plants show stunting; secondary veins become chlorotic and thick. Symptoms can be detected in seedlings at approximately one month of age. In later stages, infected plants develop a reddish color and form either no ear or simply nubbins which are often bent at the tip. The tassels and upper leaves are malformed and underdeveloped .

synonym: "MRDV" RELATED

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

synonym: "VirusMaizeRoughDwarfPer" RELATED []

xref: IMIS\_TRAITID:2126

is\_a: CO\_322:0000047 ! viral disease

[Term]

id: CO\_322:0000098

name: maize stripe virus

def: "Scored for the plant response to the viral agent causing maize stripe virus (MStV) disease." [CO:rs "ISBN:9706481095"]

comment: Symptoms: Starts as fine stripes going often to broad bands of chlorosis. Often the top of the plant bends. Underdevelopment of ear.

synonym: "maize hlorotic stripe" RELATED

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

synonym: "maize hoja blanca" RELATED

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

synonym: "VirusMaizeStripePer" RELATED []

xref: IMIS\_TRAITID:2128

is\_a: CO\_322:0000047 ! viral disease

[Term]

id: CO\_322:0000099

name: maize dwarf mosaic virus

def: "Scored for the plant response to the viral agent causing maize dwarf mosaic virus (MDMV) disease." [CO:rs "ISBN:9706481095"]  
comment: Symptoms: Mosaic pattern on youngest leaves; chlorotic streaks and general chlorosis, then purple-red; some stunting.  
synonym: "VirusM" RELATED []  
xref: IMIS\_TRAITID:10402069  
is\_a: CO\_322:0000047 ! viral disease

[Term]

id: CO\_322:0000100  
name: maize streak virus  
def: "Scored for the plant response to the viral agent causing maize streak virus symptoms (MSV) disease." [CO:rs "ISBN:9706481095"]  
comment: Symptoms: Streaking, broken and yellow, beginning as small, white, round spots.  
synonym: "MSV, VirusM" RELATED []  
xref: IMIS\_TRAITID:2127  
is\_a: CO\_322:0000047 ! viral disease

[Term]

id: CO\_322:0000101  
name: sugarcane mosaic virus  
def: "Scored for the plant response to the viral agent causing sugarcane mosaic virus (SCMV) disease." [CO:rs "ISBN:9706481095"]  
comment: Symptoms: Mosaic pattern on youngest leaves; chlorotic streaks and general chlorosis, then purple-red; some stunting.  
synonym: "SCMV, VirusS" RELATED []  
xref: IMIS\_TRAITID:2130  
is\_a: CO\_322:0000047 ! viral disease

[Term]

id: CO\_322:0000102  
name: root capacitance  
def: "Estimation of root mass at the end of the stress using an electrical capacitance meter." [CO:rs]  
comment: It is measured using an electrical capacitance meter and evaluated at the end if the stress.  
synonym: "RCT" RELATED []  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]

id: CO\_322:0000103  
name: tryptophan content  
def: "Total percentage of tryptophan." [CO:rs]  
xref: IMIS\_TRAITID:2104  
is\_a: CO\_322:0000029 ! quality trait

[Term]

id: CO\_322:0000104  
name: lysine content  
def: "Total percentage of lysine." [CO:rs]  
xref: IMIS\_TRAITID:2099

is\_a: CO\_322:0000029 ! quality trait

[Term]

id: CO\_322:0000105  
name: ear leaf chlorophyll content  
def: "Amount of chlorophyll content in the ear leaf measured at the beginning and the end of the stress using a SPAD meter." [CO:rs]  
synonym: "ELCH" RELATED []  
is\_a: CO\_322:0000003 ! chlorophyll content

[Term]

id: CO\_322:0000106  
name: tryptophan per endosperm  
def: "Percentage of tryptophan in grain endosperm on dry matter basis." [CO:rs]  
xref: IMIS\_TRAITID:2123  
is\_a: CO\_322:0000103 ! tryptophan content

[Term]

id: CO\_322:0000107  
name: tryptophan per whole grain  
def: "Percentage of tryptophan in whole grain on dry matter basis." [CO:rs]  
xref: IMIS\_TRAITID:2068  
is\_a: CO\_322:0000103 ! tryptophan content

[Term]

id: CO\_322:0000108  
name: lysine per whole grain  
def: "Percentage of lysine in whole grain m on a dry matter basis." [CO:rs]  
xref: IMIS\_TRAITID:2044  
is\_a: CO\_322:0000104 ! lysine content

[Term]

id: CO\_322:0000109  
name: lysine per endosperm  
def: "Percentage of lysine in grain endosperm on a dry matter basis." [CO:rs]  
xref: IMIS\_TRAITID:2095  
is\_a: CO\_322:0000104 ! lysine content

[Term]

id: CO\_322:0000110  
name: iron content  
def: "Total iron content in grain." [CO:rs]  
xref: IMIS\_TRAITID:2093  
is\_a: CO\_322:0000029 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2010-04-16T12:23:43Z

[Term]

id: CO\_322:0000111  
name: zinc content  
def: "Total zinc content in grain." [CO:rs]  
xref: IMIS\_TRAITID:2131  
is\_a: CO\_322:0000029 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2010-04-16T12:24:11Z

[Term]

id: CO\_322:0000112  
name: ear leaf weight  
def: "Weight of ear leaf (blade) in gm." [CO:rs]  
synonym: "ELW" RELATED []  
is\_a: CO\_322:0000174 ! morphological trait

[Term]

id: CO\_322:0000113  
name: abscisic acid content  
def: "Measures the abscisic acid content in a plant or plant part."  
[Gramene Plant Trait Ontology:TO\ :0002667]  
synonym: "ABA" RELATED []  
synonym: "ABA content" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000114  
name: sugar content  
def: "Amount of sugar present in the plant or the plant part."  
[Gramene Plant Trait Ontology:TO\ :0000333]  
synonym: "SUG, SUGARCN" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000115  
name: glucose content  
def: "Amount of glucose present in the plant or plant part." [Gramene  
Plant Trait Ontology:TO\ :0000300]  
synonym: "GLC" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000116  
name: selection index  
def: "The selection index gives a single measure of the hybrid's worth  
based on information for up to five traits."  
[<http://www.freepatentsonline.com/7087822.html>]  
xref: IMIS\_TRAITID:2056  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]

id: CO\_322:0000117  
name: osmotic adjustment

def: "The ability of the plant to adjust the osmotic potential under stress conditions." [Gramene Plant Trait Ontology:TO\:0000507]  
synonym: "OA" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]  
id: CO\_322:0000118  
name: osmotic potential  
def: "A measure of the potential of water to move between regions of differing concentrations across a water-permeable membrane." [CO:rs, <http://www.biology-online.org/dictionary/>]  
synonym: "OP" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]  
id: CO\_322:0000119  
name: proline content  
def: "Amino acid proline content in a plant or plant part." [Gramene Plant Trait Ontology:TO\:0006002]  
synonym: "PRO" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]  
id: CO\_322:0000120  
name: sucrose content  
def: "The amount of sucrose present in the plant or the plant part." [Gramene Plant Trait Ontology:TO\:0000328]  
synonym: "SUC" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]  
id: CO\_322:0000121  
name: protein content  
xref: IMIS\_TRAITID:2100  
is\_a: CO\_322:0000029 ! quality trait

[Term]  
id: CO\_322:0000122  
name: protein per whole grain  
def: "Percentage of protein in whole grain on a dry matter basis." [CO:rs]  
xref: IMIS\_TRAITID:2053  
is\_a: CO\_322:0000121 ! protein content

[Term]  
id: CO\_322:0000123  
name: protein per endosperm  
def: "Percentage of protein in grain endosperm on a dry matter basis." [CO:rs]  
xref: IMIS\_TRAITID:2106  
is\_a: CO\_322:0000121 ! protein content

[Term]  
id: CO\_322:0000124  
name: abscisic acid to sugar content ratio  
def: "A ratio of abscisic acid to the sugar content in a plant or plant part." [CO:rs]  
relationship: derived\_from CO\_322:0000113 ! abscisic acid content  
relationship: derived\_from CO\_322:0000114 ! sugar content

[Term]  
id: CO\_322:0000125  
name: provitaminA content  
def: "Total provitaminA content in grain." [CO:rs]  
xref: IMIS\_TRAITID:2107  
xref: IMIS\_TRAITID:2108  
is\_a: CO\_322:0000029 ! quality trait

[Term]  
id: CO\_322:0000126  
name: starch content  
def: "Total starch content in grain." [CO:rs]  
is\_a: CO\_322:0000029 ! quality trait  
created\_by: RSHRESTHA  
creation\_date: 2010-04-16T12:25:50Z

[Term]  
id: CO\_322:0000127  
name: large grain borer damage  
def: "Large grain borer (*Prostephanus truncatus*) damage rated on selection index or natural infestation (1-10) adjusted to 1-5 where (= no infestation) to 5 (= severely infested)." [CO:rs]  
xref: IMIS\_TRAITID:2040  
is\_a: CO\_322:0000048 ! insect damage

[Term]  
id: CO\_322:0000128  
name: aphid damage  
def: "Scored for the plant damage caused by aphids (*Rhopalosiphum maidis*)." [CO:rs]  
comment: Aphid sucks on juices from the tassels and silk, on the leaves sheathing the cob, and with heavy infestations, the underside of leaves.  
synonym: "Aphid" RELATED []  
xref: IMIS\_TRAITID:2002  
is\_a: CO\_322:0000048 ! insect damage

[Term]  
id: CO\_322:0000129  
name: maize weevil damage  
def: "Scored for the plant damage based on a selection index or natural infestation caused by maize weevil." [CO:rs]  
synonym: "MaizeB" RELATED []  
xref: IMIS\_TRAITID:2046

is\_a: CO\_322:0000048 ! insect damage

[Term]

id: CO\_322:0000130

name: total grain weevil number

def: "Number of grain weevils hatching and emerging from an infested grain sample within a given period. Large values indicate susceptibility to grain weevils, small values indicate partial resistance to grain weevils." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]

synonym: "weevil" RELATED []

xref: IMIS\_TRAITID:2071

is\_a: CO\_322:0000048 ! insect damage

[Term]

id: CO\_322:0000131

name: weevil grain weight loss

def: "Loss of weight of the grain samples caused by weevil feeding during a given period of incubation. Large values indicate susceptibility to weevils." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]

synonym: "weevil" RELATED []

xref: IMIS\_TRAITID:2072

is\_a: CO\_322:0000048 ! insect damage

[Term]

id: CO\_322:0000132

name: normalized difference vegetation index

def: "Measured with a portable field spectroradiometer (e.g. GreenSeeker). The sensor placed ca 60 cm above the plants." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]

comment: Minimum number: on 2-3 stages along the crop

cycle:\nVegetative stage: 1 month after planting; Flowering: only for inbred lines; Grain filling: 2 and 4 weeks after anthesis in inbred lines and 4 weeks after anthesis for hybrids.\nOptimum number of measurements: \nVegetative stage: Weekly measurements from 2 to 6 weeks after planting; Flowering: only for inbred lines; Grain filling: Weekly from 1 to 4 weeks after anthesis in inbred lines and 2 to 4 weeks after anthesis for hybrids. In case of hybrids under well watered conditions measurements may be continued until one week prior maturity.\nThe reason to do not measure NDVI of hybrids at flowering is because readings are usually saturated (i.e. which correspond to NDVI values beyond 0.65) and therefore precision is negatively affected.

synonym: "NDVI" RELATED []

is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000133

name: 100 kernal weight

def: "Weight of 100 kernels randomly selected from the total kernels." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]

is\_a: CO\_322:0000176 ! agronomic harvest trait

[Term]

id: CO\_322:0000134

name: stomatal conductance

def: "Measured with a portable porometer." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]

comment: Take the measures in the middle between leaf tip and leaf base, and in between leaf midrib and leaf rim. Blade sections measured must to be exposed to sunlight for at least the 30 minutes before. Measurements always performed in the same side of the leaf (usually the lower or abaxial one). One measurement per leaf, and at least 3 per plot. 1 min per measurement. Optimal period for measurements: from 10 -14 h; if needed it may be expanded from 10-15h of sunny days. Never touch with the finger the area where the clamp will be placed. Measurements are recorded in continuum and downloaded in the computer as a unique excel file.

xref: IMIS\_TRAITID:2064

is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000135

name: leaf temperature

def: "Measured as absolute temperature or as a the difference between air and leaf temperature by as infrared thermometer." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]

comment: Measure preferably the same side of the leaf (in this case the upper or adaxial). Leaves (i.e. insertion level within the plant), blade section of the leaf, measuring period and environmental conditions for measurements as for the stomatal conductance, but giving more emphasis to the steadiness of environmental conditions (sunny days, no clouds passing and lack of wind). One measurement per leaf, and at least 3 per plot. Each measurement may take few seconds. Usually these thermometers have not data logger so it is needed a second person to record the readings.

is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000136

name: stable oxygen isotope enrichment in kernels

def: "Samples analyzed by isotope-ratio mass spectrometry. One measurement per row from the pooled set of mature kernels. Measured In subsets of inbreds and testcrosses with contrasting yields." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]

is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000137

name: total mineral content

def: "Determined in the same kernels used for Stable oxygen isotope enrichment analyses. Measured as ash content directly with a furnace

or indirectly through Near Infrared Reflectance Spectroscopy (NIRS)."  
[CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000138  
name: total nitrogen content  
def: "Determined in the same kernels used for stable oxygen isotope enrichment analyses. Measured using an Elemental Analyzer (if analyzed together with stable nitrogen isotope composition or through NIRS when analyzed alone." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000139  
name: stable nitrogen isotope composition  
def: "Determined in the same kernels used for stable oxygen isotope enrichment analyses. Measured using an Isotope Ratio Mass Spectrometer." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000140  
name: photochemical radiation index  
def: "Measured in leaves with an hyperspectral spectroradiometer at anthesis and 2-3 weeks later." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]  
synonym: "PRI" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000141  
name: water index  
def: "Measured in leaves with an hyperspectral spectroradiometer at anthesis and 2-3 weeks later." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]  
synonym: "WI" RELATED []  
is\_a: CO\_322:0000006 ! physiological trait

[Term]

id: CO\_322:0000142  
name: canopy temperature  
def: "Measured in several rows simultaneously to allow a comparison. Thermal images will be taken using an Infrared Camera placed several meters above the canopy." [CO:rs "personal communication with Cabreara B Llorenc, CIMMYT"]  
synonym: "Thermal imaging" RELATED []  
xref: IMIS\_TRAITID:2039  
is\_a: CO\_322:0000006 ! physiological trait

[Term]  
id: CO\_322:0000143  
name: days to ear leaf senescence  
def: "Number of days from sowing to when 50% of the plants have a dry ear leaf." [CO:rs, ISBN: 92-9043-189-1]  
comment: The mean of at least 20 representative plants should be used.  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]  
id: CO\_322:0000144  
name: silk growth  
def: "Difference between the silk length measured at zero day pollen shedding and 7 days after pollen shedding." [CO:rs "personal communication with Jean-Marcel Ribaut, GCP"]  
is\_a: CO\_322:0000002 ! agronomic trait  
creation\_date: 2010-01-21T07:24:11Z

[Term]  
id: CO\_322:0000145  
name: ear growth  
def: "Difference between the ear length (cm) measured at zero day pollen shedding and 7 days after pollen shedding." [CO:rs "personal communication with Jean-Marcel Ribaut, GCP"]  
is\_a: CO\_322:0000002 ! agronomic trait  
created\_by: RSHRESTHA  
creation\_date: 2010-01-21T07:25:42Z

[Term]  
id: CO\_322:0000146  
name: grain color  
def: "Kernel or grain color whether white, yellow, purple, variegated, brown, orange, mottled, white cap, red etc." [CO:rs, ISBN: 92-9043-189-1]  
synonym: "kernel color" RELATED []  
xref: IMIS\_TRAITID:2087  
is\_a: CO\_322:0000174 ! morphological trait  
creation\_date: 2010-04-16T12:21:21Z

[Term]  
id: CO\_322:0000147  
name: relative grain yield  
def: "Relative grain yield expressed as percentage of the mean grain yield of the trial. Values above 100% indicate above-average performance; values below 100% indicate below-average performance."  
[CO:rs]  
xref: IMIS\_TRAITID:2101  
xref: IMIS\_TRAITID:2110  
xref: IMIS\_TRAITID:2111  
xref: IMIS\_TRAITID:2112  
is\_a: CO\_322:0000005 ! grain yield

[Term]

id: CO\_322:0000148  
name: adjusted grain yield  
xref: IMIS\_TRAITID:2088  
xref: IMIS\_TRAITID:2089  
is\_a: CO\_322:0000005 ! grain yield

[Term]

id: CO\_322:0000149  
name: husk cover  
def: "Measured as percentage of plants with ears that are not completely covered by the husks." [CO:rs]  
synonym: "BadHus" RELATED []  
is\_a: CO\_322:0000002 ! agronomic trait

[Term]

id: CO\_322:0000150  
name: bad husk cover  
def: "Percentage of all plants with bad husk cover." [CO:rs]  
xref: IMIS\_TRAITID:2007  
is\_a: CO\_322:0000149 ! husk cover  
created\_by: RSHRESTHA  
creation\_date: 2010-04-16T02:24:12Z

[Term]

id: CO\_322:0000151  
name: chupon percentage  
def: "Multiple cobs, Chupones, percentage of plants with more than one cob growing in same place." [CO:rs]  
xref: IMIS\_TRAITID:2011  
is\_a: CO\_322:0000002 ! agronomic trait  
created\_by: RSHRESTHA  
creation\_date: 2010-04-16T12:44:21Z

[Term]

id: CO\_322:0000152  
name: busseola damage  
def: "Count of the number of Busseola larvae. Higher the number indicates susceptibility." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]  
synonym: "african stem borer" RELATED []  
synonym: "busseo" RELATED []  
synonym: "maize stalk borer" RELATED []  
xref: IMIS\_TRAITID:2077  
is\_a: CO\_322:0000048 ! insect damage

[Term]

id: CO\_322:0000153  
name: earworm damage  
def: "Scored for the plant damage caused by ear worm (Heliothis zea)." [CO:rs]  
synonym: "corn earworm" RELATED []  
synonym: "EarWor" RELATED []

xref: IMIS\_TRAITID:2029  
is\_a: CO\_322:0000048 ! insect damage

[Term]

id: CO\_322:0000154  
name: army worm damage  
def: "Scored for the plant damage caused by army worm (*Spodoptera exempta*)."  
[CO:rs]  
synonym: "ArmyWo" RELATED []  
xref: IMIS\_TRAITID:2003  
is\_a: CO\_322:0000048 ! insect damage

[Term]

id: CO\_322:0000155  
name: chilo damage  
def: "Scored for the plant damage caused by Chilo (*Chilo partellus*)."  
[CO:rs]  
xref: IMIS\_TRAITID:2079  
is\_a: CO\_322:0000048 ! insect damage  
created\_by: RSHRESTHA  
creation\_date: 2010-04-16T12:27:06Z

[Term]

id: CO\_322:0000156  
name: diabrotica damage  
def: "Scored for the plant damage caused by Diabrotica (*Diabrotica* spp.)."  
[CO:rs]  
synonym: "corn rootworm" RELATED []  
xref: IMIS\_TRAITID:2080  
is\_a: CO\_322:0000048 ! insect damage  
created\_by: RSHRESTHA  
creation\_date: 2010-04-16T12:29:12Z

[Term]

id: CO\_322:0000157  
name: diatraea damage  
def: "Scored for the plant damage caused by Diatraea (*Diatraea* spp.)."  
[CO:rs]  
synonym: "sugarcane borer" RELATED []  
xref: IMIS\_TRAITID:2081  
is\_a: CO\_322:0000048 ! insect damage  
created\_by: RSHRESTHA  
creation\_date: 2010-04-16T12:41:19Z

[Term]

id: CO\_322:0000158  
name: striga damage  
def: "Scored for the plant damage caused by *Striga hermonthica* plants."  
[CO:rs]  
xref: IMIS\_TRAITID:2065  
xref: IMIS\_TRAITID:2121  
is\_a: CO\_322:0000048 ! insect damage

created\_by: RSHRESTHA  
creation\_date: 2010-04-16T12:44:08Z

[Term]

id: CO\_322:0000159  
name: stem borer damage  
def: "Scored for the plant damage caused by different stem borers such as *Chilo partellus*, *Sesamia calamistis* and *Spodoptera* spp." [CO:rs]  
synonym: "pink stem borer" RELATED []  
xref: IMIS\_TRAITID:2062  
is\_a: CO\_322:0000048 ! insect damage

[Term]

id: CO\_322:0000160  
name: leaf rolling  
def: "Leaf rolling score measured under drought stress on a scale from 1 (unrolled, turgid leaves, desirable) to 5 (severely rolled leaves, undesirable)." [CO:rs "personal communication with Vivek Bindiganavile, CIMMYT"]  
synonym: "LeafRo" RELATED []  
xref: IMIS\_TRAITID:2043  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000161  
name: late wilt  
def: "Scored for the plant response to the viral agent *Cephalosporium maydis* causing late wilt disease." [CO:rs]  
comment: Symptoms: Wilting from top leaves at tasseling stage.  
synonym: "LateWi" RELATED []  
xref: IMIS\_TRAITID:2094  
is\_a: CO\_322:0000046 ! fungal disease

[Term]

id: CO\_322:0000162  
name: stem color  
def: "Color of the stem." [CO:rs]  
comment: Indicate up to three stem colors in the order of frequency (1, green; 2, sun red; 3, red; 4, purple; and 5, brown). Observed between the two topmost ears.\nGrowth stage: At flowering.  
is\_a: CO\_322:0000002 ! agronomic trait  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T11:06:24Z

[Term]

id: CO\_322:0000163  
name: sheath pubescence  
def: "Presence and intensity of hairs (sparse or intermediate or dense) on the surface of the leaf sheath." [CO:rs "ISBN:9290431891"]  
comment: Growth stage: At flowering stage.  
is\_a: CO\_322:0000002 ! agronomic trait

created\_by: RSHRESTHA  
creation\_date: 2010-08-31T11:24:16Z

[Term]

id: CO\_322:0000164  
name: tassel type  
def: "Branching type of tassel whether primary or primary-secondary or primary-secondary-tertiary." [CO:rs "ISBN:9290431891"]  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T11:29:34Z

[Term]

id: CO\_322:0000165  
name: ear damage  
def: "Scored for the ear damage caused by ear rot and/or insects, etc." [CO:rs "ISBN:9290431891"]  
is\_a: CO\_322:0000048 ! insect damage  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T11:36:30Z

[Term]

id: CO\_322:0000166  
name: kernel row arrangement  
def: "A visual assessment of kernel row arrangement where: 1, regular; 2, irregular; 3, straight and 4, spiral." [CO:rs "ISBN:9290431891"]  
comment: Use the uppermost ear.  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T11:38:15Z

[Term]

id: CO\_322:0000167  
name: kernel row number  
def: "Count number of kernel rows in the central part of the uppermost ear." [CO:rs "ISBN:9290431891"]  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T11:43:53Z

[Term]

id: CO\_322:0000168  
name: kernel type  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T12:30:35Z

[Term]

id: CO\_322:0000169  
name: 1000 kernel weight  
def: "Weight of 1000 kernels randomly selected from the total kernels and adjusted to 10% moisture content." [CO:rs "ISBN:9290431891"]

is\_a: CO\_322:0000176 ! agronomic harvest trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T02:43:04Z

[Term]

id: CO\_322:0000170  
name: ear diameter  
def: "Ear diameter measured in centimeter at the central part of uppermost ear." [CO:rs "ISBN:9290431891"]  
comment: At least 20 representative plants per accession should be taken.\nGrowth stage: After harvest.  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T03:52:52Z

[Term]

id: CO\_322:0000171  
name: uppermost ear shape  
def: "Shape of uppermost ear whether cylindrical or cylindrical-conical or conical or round." [CO:rs "ISBN:9290431891"]  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T03:57:01Z

[Term]

id: CO\_322:0000172  
name: kernel length  
def: "Average of 10 consecutive kernels from one row in the middle of the uppermost ear." [CO:rs "ISBN:9290431891"]  
comment: It is measures with a calliper.  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T03:58:57Z

[Term]

id: CO\_322:0000173  
name: foliage rating  
def: "Rating of total leaf surface where: 3, small; 5, intermediate; 7 large." [CO:rs "ISBN:9290431891"]  
comment: Observed on at least 20 representative plants. \nGrowth stage: after milk stage.  
is\_a: CO\_322:0000002 ! agronomic trait  
created\_by: RSHRESTHA  
creation\_date: 2010-08-31T11:00:18Z

[Term]

id: CO\_322:0000174  
name: morphological trait  
relationship: part\_of CO\_322:0000000 ! CGIAR maize trait ontology  
created\_by: RSHRESTHA  
creation\_date: 2010-10-25T11:02:09Z

[Term]  
id: CO\_322:0000175  
name: kernel width  
is\_a: CO\_322:0000174 ! morphological trait  
created\_by: RSHRESTHA  
creation\_date: 2010-10-25T05:00:57Z

[Term]  
id: CO\_322:0000176  
name: agronomic harvest trait  
is\_a: CO\_322:0000000 ! CGIAR maize trait ontology  
creation\_date: 2011-06-17T11:43:55Z

[Typedef]  
id: derived\_from  
name: derived\_from  
is\_transitive: true  
creation\_date: 2011-06-09T11:59:11Z

[Typedef]  
id: part\_of  
name: part\_of  
is\_transitive: true  
creation\_date: 2011-03-02T02:56:20Z