

xnf -!

VÆKX • i Š Ū àl™i ~: WäŠÆTì V { " çfqtì Š7ŃzpgmĐy0{Æk vxn
 »«ztægjî õ5l' Xì @Y¹gc09MÄ{ á lz ä3Æ` tlgz • DfñfñÈÐ } uδq1~] gBÁÚpq1
 ~ ~g»Ä) zDŠgzl0600~. 00KzgMwtgzlì @YŃJe ~ ^ ÁLWÄTì ` tLq1xn Xì ölañYÄxn' ~
 ~ xI làz äYðçZÄxnÄ` WXì @YHwE l~ÄÄ3A0gZl2] !zæÆ [ŃÄklz`ÆKXì @fWE l
 äfWE l~ äz) Triticum durumgzl(xnàz äfWE l~ Kzg) Triticum aestivum L.XI lX-ŃciĐf
 X • (xnàz

la xn~ *Š5X ¶Hu• 683.15gzla ~ Y2009ÄKIXì ` tLŃz äfWE l{ŃciĐf xn^ Æh
 Æo xnàz äflaV(Epì oL(ĐfŃz ä™la xnu X • i pM%0c&0u ~ ~ } {&á lz ä™
 (1 i @™la xn:Ń, ýhÉ t 2Đ1.3w, CM%Xì @™la xn. _Æ] gçKlì c&Xì CYfWE l,, g0
 Klì í Oglgz1`7W0" Xì @Yc™æW o yŮŮ »Klp bushel of wheat at 13.5% moisture=27.21kg)
 6Xì ;gfÄ w" »S lÆKlgz1 ðfµz ¶~gzlaÄxnylgzŠÆð;Š, *X • i Š™æW o yŮz q1»
 zÄg»i Šî lzgá lz äYKg (la Æö0) LÄxnžVYì gD»: gzlaÄxn~ « ÆÆî cîgzlh
 gzi6ä™g (lj Sh]ÆYB(-la Æw" Ægzla °YÄxn[pVO0Xì ú¹ ĐV" VáŠ{gÆtĐ
 Xì e tĐj Šî lzg™i ÄX • MYKi b) (zĐŠæÄTì ;gYcŠ

xnî qÄ ٲٲٲ ٲٲ ٲٲ

ì clearfield wheat Xç»T 0ðz™sg" 6äecg^xnàz ٲٲٲ ٲٲ ٲٲ « ~Y2007 ~l" äBASf
 lz çZtì Sg{0i1 ~iŠžňÄ imidazolinone herbicidežžì gzlaÄö0) l{ " çf Clearfield wheatX
 ~ 5 lgdc»SÆCElÄlgšc~gzca Æ%Ä} Š7AHASXì ÄžÄouÄ (AHAS) çCElÈWzge; I+l
 gzlaÄ00%Æé ~ÝžÄò}{Š™YqĐöäiWälz äYÄĐá jÆKl~M%Xì iLz^ Ńz äW
 6Xì /xÆè]L lclearfieldĐá jÆyDÆö0) LÄk1~agz0k ĐV-gF0(á)
 ~Äg» • ÆMonsanto, the MON 71800) gfÆ8 çE7CQ` «Äxnàz ä™ ٲٲٲ ٲٲ ٲٲ Cm
 ŽŮ x-q1Ńz äYc0~ } ia Æä™g»xnàz ٲٲٲ ٲٲ ٲٲ Ä ðtXì Roundup Ready WheatXçCg^ »Kl

ìl4l 6 q1XŠ ciz™ Sg" ~ xn Agrobacterium tumefaciens strain CP4
žŽĀĀā á lz äfwE la Ægzla Ā ^ h} Ā 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS)
gzl%Ā} Š7i gŠ) f»; @Ā] · %gŠ Āp} uzŠgzli (E1ĀgŠ Āp3 hđ6 CŠq10i @™x» ~ 5 hshikimate
• „ ÜxI lî lzg] : SĀxn~i g\l&f hžì _f"U] ItĐ] Y. _óžpđXŠc0iĀa Æ] Š
0Xī H7ē »ä™7 b äeCg^ ~ L gâJlĪ ĪĀkl ä Monsantoë@

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xn3& ĐVzhc} Q

(Tilletia 0ī x-āz• ~ V[gzl ŽSA0(Puccinia graminis), P~ Tī 0fo, »0ī ĀxI lFĀxn
žŽī 0ī [lyĐf ŽSA~đ; ylx • DY' Đ~! ~ ` Āxn~i ŠŽñĀ&t • i 0ī tritici)
la 7 äŠ Ī ÇIQc• Dfla äŠ Lgđ• l~# • ~ ĒÆkĪ0 • سن » head blight & crown rot
0° 0...Ā• z » 1/2 ĀVzgāYcVāc{z Z>gzl• DfYCiQc• D- Ć+ ĪĀđāžD>%o Æ ŽSA X Df
1āHqz Īx»6" μÆ ä™g» xn3& Đ ŽSA ä Syngenta X • سن » V-gF-uzŠgzl! ly~ yi ĪÆyñg;
äfla Đá l jÆxnf -lXŠcŠ™yñĐzĀ] Ÿl< lá lz äYK6YB (-lĐ± YĀxlĪ" μk l~ Y2007
~g» Āxn3& Đ0ī āz• ~ Vā0 Syngenta 0Xī Šfgly lo Ćq1x ā00& Fusarium Ā7 Æp ŠDqāz
0XÇñYHwE l»ú yzç™gāa ÆÑ kĪ0i „ g™x» pB, ÆCIMMYTA Æ

Š~xn) gfÆ] Y. _{e{e ä > Æ6đ'W4lyYgzl ^ kXlYBĒĒ öi†~ cg-i ~ Y2009
Āā Lr34 ä > Æcg-i 03Xī Š™7i + 4»} çÆ0ī ~ xni t0Hs Ī l»i ŠŽñĀā 3& Đ0ī
i @Yc0 ~ n1 ĀxnžŽHĀcğš ā Yr36 ä VāŠb , Æç 4lyY • D™kç S ÜÆV-gFZ žŽĀh ,
gzlī @™ç Ī ÜĀđŠžñ~ ~gFYr36žŃi³ tĐi klä VāŠb , Xī @Yf#Ÿ~ çÆöĪ l6Rwyp
Xī @™-gYe@ĀŠg3&

xn ĀxI lZ {zXī Ā~g} tāu~ (Đf~ ylyÆxnf -lā(CAAS) b , x~v lS Wb0Īi
Yellow X • i 09 3& ĐVzhc} Qgzl-0ī Ā ^ ĀS` 0head scab0k} lyellow mosaic ~ T • i ™g»
nĀxnāz ä™ĀĀ; ÆUYyĀ~ ; gE- x~vly | 0504Xīf [0š ~ gzi lJY2015 n3& Đ Mosaic Virus
7 6gī Cg^ JY2013cY2012nt ĀxnXnYHĀĀyv , 20á lz äfĐzĀäWyĀ~ Đ0%ž@ „ gYĀg»
06Xī ñY~Š™

xnàzä™"Š'Ä#

t(Nax1 and Nax2) • a™Äcgs, - ÇZÄXná lz äYÄ# ä ^ a^g~7&L-öCISRO
Vp+gzlaa Ä} \$7žž òì HÖl»ŽÎä ÇVäSX • t ÐTriticum monococcum Ý ÐnäbÄxn
ÄíÑá Nax2 ~] !Šályá lz äYK ~ ´7W Y2009 Ç7X • Mf ÇUYC i™wle ^ zyg ~ 5 gyxgÄ
X~Šgzla {Sci, 25 ~ iŠžÑÄe gðä Vžš

ì CfÐzzÄWE IÄgluten~gFtòifpôa ÄŠb lgD»V-gFÄüžž • „gYÄg»x l+lÄxn
d lzXì @YfgD»¶Äi Gb! %ÐzzÄT òì rle ^ zyg ~ x ÇVÄYl bð½q(ZÄE™ [lyÄ-WKggz
gliadins á lz ä™la-gFÄüÐ ~ xn~Tì „gYÄg»xn+l ñfD™WE IÄeÇQ~ ; gE-Ä l
qtì µÄäf {Sci} gll Ä- ðÑ~nkXifµz~4h~ ~ α SÄÖÄxnÐ klgzÇñYcšwiC!Ä
Ç8Xì @Yc0Ä¹ ~ xnžžì ÇEÄäòìÑ

xnàzä™"Š'ä, È

X +Fèlq¶¶Ää0ÐzzÄ~pŠñ@~gžš{Šžñm<li !pèlq¶Ðá jÄxnØ& Ðà, È
ò ÄÄV;žÐzzÄà, È ~ ´7W} òì C™Ä%] ZWZ} • 6u Äoì È¶~gzlaÄ` Çl Ç9Xì „gYK
Ä, 70~ðäÄxnÐzzÄà, È h" ~Y2007 ~tgÍzX(ylgžšÄY2003ÐY2002) ¶~fµz¶Ä, q¶~äæW
Wz6Äm7&l-Îl6SW¹ g6e~tgÍz~Y2007XZ7Ç™"Š' {gÄ}°le • 300Ä ÇgÐzzÄT ò¶~fµz¶¶
thale cress (Zea mays), h~T ~ íÑCÄxnXK] !ŠóíÑ è ÇR 30Äxnä Spangenberg Ö
Äà, È • i Ç (Saccharomyces cerevisiae). P(Physcomitrella-patens) ð»(Arabidopsis thaliana)
Ä pathways ð6 CŠžž • D™ encode ~È×gÄ" z6+lâtxñfÄcgs ä 6 á lz ä™Š'Š'
ià, È ...~VB, &{ÖWÄ~f [x»rtÄxnÇXì Bì iÄ%òÄÄ} Š7l ~gll ÄÄä0 ÄE™ regulate
ä International Maize and Wheat Improvement Center (CIMMYT) bŠì lÇXì ñYf ½xnàz äY
8b lCžXì ÄÖÄÄä™¶Ýl~] : SÄxnñfD™WE l(DREB1A) äqÐ Arabidopsis thaliana
Ç1Xì i qÄÇ&Ää™"Š'Äe gðz] gmwžšÄ0à, È xnt {Š™g»Ð

µñlžšÄ Äxn f -!

ä™76gî Cg^Äyl~Y2004gzY2003ÐzzÄ~p~ÝÄ~gàa Äxn f -lç(GM) {" ÇFCQ
ä™"»Äxnä(NAWG) ^ ò, àz äÇlxn Ç2Xì Ç #ðf f(ÄV" è ÇRzÄk lŠcŠ™yñÄ" µÄ

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~ ~ g » Ā x n f - l ž • % o f l a] t k Ī Ā] Ī k l l ˆ X ĩ „ g W Ā p Š R @ - O i Š q 1 D á j Ā x n * Ī Y
 "The Case of Biotech y l > ! ě Ň z ä Y K ~ g Y D ˆ Y Ā Wheat Food Organization X ĩ ŋ W ~ !
 V z g p » A x n g z l ˆ ˆ f ˆ ˆ Ī é • ě D á j Ā E (ĩ g D » w z i ˆ ˆ o z k ž ž 0 Ā x n) ä - y i Ī á Ī] z) V) Wheat"
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