No. 9800199

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Dr. Peter Jranck

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE [illegible]HTE TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR [illegible]RTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE [illegible]PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT [illegible] BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) S[illegible]OLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NU[illegible]GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'Dandy'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this fifteenth day of February, in the year of our Lord two thousand one.

Attest:

Acting Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(INSTRUCTIONS ON REVERSE)

Application is required in order determine if a plant variety protec certificate is to be issued (7 U.S 2421). Information is held confider until certificate is issued (7 U.S.C. 242

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate): Dr. Peter Franck
2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.: SL93609
3. VARIETY NAME: Dandy (Synonym for Quantum)
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP): Pflanzenzucht Oberlimpurg, Dr. Franck, 74523 Schwäbisch Hall
5. PHONE (include area code): (49) 791-93-1180

FOR OFFICIAL USE ONLY

PVPO NUMBER: 9800199

FILING — Date: 4-14-98; Time: ☐ A.M. ☐ P.M.

FEES RECEIVED — Filing and Examination Fee: $ 2450.00; Date: 4/14/98; Certificate Fee: $ 320.00; Date: 1/18/00

6. GENUS AND SPECIES NAME: Triticum aestivum L.
7. FAMILY NAME *(Botanical)*: GRAMINEAE
8. CROP KIND NAME *(Common Name)*: Spring Wheat
9. DATE OF DETERMINATION: 1992
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)
11. IF INCORPORATED, GIVE STATE OF INCORPORATION
12. DATE OF INCORPORATION
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Peter E. Bonis
Seed-link Inc.
P.O. Box 217
Lindsay, Ontario K9V 5Z4 Canada

PHONE (include area code): (705) 324-0544

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*
   a. ☒ Exhibit A, Origin and Breeding History of the Variety
   b. ☒ Exhibit B, Novelty Statement
   c. ☒ Exhibit C, Objective Description of Variety
   d. ☐ Exhibit D, Additional Description of Variety
   e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership
   f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____
   g. ☒ Filing and Examination Fee ($2,325) made payable to "Treasurer of the United States"
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act)* ☒ YES *(If "YES," answer items 16 and 17 below)* ☐ NO *(If "NO," skip to item 18 below)*
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☒ YES ☐ NO
17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? ☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
   ☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____).
   ☒ NO
19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
   ☐ YES (If "YES," GIVE NAMES OF COUNTRIES AND DATES) _____
   ☐ NO
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT (Owner(s))	CAPACITY OR TITLE	DATE
SIGNATURE OF APPLICANT (Owner(s)) Dr. Peter Franck	CAPACITY OR TITLE: BREEDER	DATE: March 24, 1998

SD-470 (06-93) *Editions of Forms LS-470 (3/86) and CSSD-470 (5/89) are to be destroyed.*

CONTINUED ON REVERSE

9800199

Exhibit A Origin and Breeding History of the Variety:

1. Description of Genealogy

   Probat, Arin, Kardett, [some] CIMMYT F_2 lines

   Pedigree : (Line BWS-01 x Line WBF 16-3-2)

   Adler, Selpek, Bobwhite, 8 CIMMYT F_2 lines

   AAA-Kiffe 2000 per letter

2. Crossing date : 1984

3. Details of subsequent stages of selection and multiplication:

   Single plant selections in F2 / F3 and F4;

   Bulk F6 : first yield a bulk of the progenies of 600 F8 random single plant selection.

4. Selection criteria:

   - high yield in combination with disease resistance respective tolerance:

     i.e. : - Fusarium head blight Res.

     - Brown Rust resistance

     - Powdery mildew resistance

   - high protein yield

5. ~~Uniformity~~ UNIFORMITY and Stability:

   The variety is both, uniform and stable.

   Very few off-types observed: 0,1 % taller plants

   0,1 % owns absent.

Method: Multiplecross 9800199

Evidence of uniformity and stability:

Since F8 the maintenance breeding is based on single plant progenies sown anually as „ear to row". Since that time (1992) stability and uniformity has been observed. Negative selection is based on obvious criteria in all stages from 4-leaf-stage to harvest. Breeders seed production is generated from this material. This and the following pedigree generations are produced under the Breeders (Dr. Peter Franck, who is a CSGA recognized plant breeder) control.

The type and frequency of variants during reproduction and multiplication and how these variants may be identified:

The variety is uniform and stable. 0,2% total variants consisting of 0,1% taller plants and 0,1% awns absent.

Exhibit A addendum, AAA 19 Jan 2000 per letter

see Question 3

9800199

Exhibit B. Statement of Distinctness

Measurement for spring wheat varieties Dandy and Grandin

From both varieties, Dandy and Grandin, 20 plants were examined in two locations and two years and the characters were measured. The datas were calculated with PLABSTAT (Utz, 1989).

Location 1: Ridgetown, Ontario, Canada
1996: planting 06.10., harvesting 15.08.
1997: planting 16.10., harvesting 03.09.

Location 2: Harriston, Ontario, Canada
1996: planting 06.10., harvesting 15.08.
1997: planting 15.10., harvesting 04.09.

A test for skewness and curtosis was made to make sure that the datas were normal-distributed. The original datas, mean values and variances for each variety, each year and each location are given in Tab.1, Tab.2 und Tab.3.

An ANOVA survey was made over years and locations to test if the two varieties can be distinguished from each other. In the statistical model varieties, locations and years were regarded as factorial factors. Repetitional measurements within varieties, locations and years were regarded as hierarchical factors. Table 4 gives the F-value for each factor and its significance (** for α=0.01, * for α=0.05 and + for α=0.1).

Result:
Dandy is a distinct variety, and among Wheat varieties, it is most similar to Grandin.
Dandy can be distringuished from Grandin in that:

- the plant height is higher than Grandin
- the flag leaf lenght is narrower than Grandin
- the awn lenght is much shorter than Grandin

Utz 1989: Plabstat. Ein Computerprogramm zur statistischen Analyse von pflanzenzüchterischen Experimenten. Version 2D. Institut für Pflanzenzüchtung, Saatgutforschung und Populationsgenetik, Universität Hohenheim, D-70599 Stuttgart

5

EXHIBIT B

DANDY WHEAT (Exp. Des 93609, Syn. Quantum)

PALMERSTON, ONTARIO - 1996

PBR Measurements

VARIETY	CHAR #	DESCRIPTION	MEASUREMENTS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Mean	Std Dev	Range
QUANTUM (Dandy)	4.3	Flag Leaf Width - mm	14	14	15	15	15	15	15	15	14	14	13	14	15	15	15	15	15	15	14	15	15	0.58	13 - 15
	4.4	Flag Leaf Length - mm	230	212	195	216	196	228	226	235	209	205	235	218	210	199	232	229	231	216	236	227	219	13.19	195 - 236
	5.3	Plant Height - cm	95	96	97	96	99	95	98	99	100	98	98	101	100	100	100	100	99	99	97	98	98	1.73	95-101
	6.7	Awn Length - mm	25	24	23	20	19	28	19	30	27	23	25	24	20	19	22	21	23	19	26	25	23	3.16	19-30
	6.10	Spike Length - mm	85	87	80	90	81	93	89	90	80	82	88	87	87	85	80	91	86	85	85	86	86	3.71	80-90
	7.1	Lower Glume Width - mm	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	3.5	4.0	3.0	4.0	4.0	4.0	3.9	0.31	3.0 - 4.0
	7.2	Lower Glume Length - mm	11.0	12.0	12.5	12.0	11.5	12.0	12.0	15.0	13.0	13.0	14.0	12.5	12.0	12.0	12.0	11.5	12.0	11.0	12.0	13.0	12.3	0.93	11.0 - 15.0
CELTIC	4.3	Flag Leaf Width - mm	16	16	15	16	16	16	17	15	16	16	17	16	17	15	17	17	16	15	16	16	16	0.67	15 - 17
	4.4	Flag Leaf Length - mm	300	287	305	271	262	280	262	255	257	245	305	240	284	295	280	265	300	280	258	290	277	19.19	245 - 305
	5.3	Plant Height - cm	98	98	98	85	89	92	96	96	90	96	95	94	91	93	93	93	97	93	90	95	94	3.34	85 - 98
	6.7	Awn Length - mm	65	64	58	59	60	61	54	57	58	63	58	56	62	63	59	60	57	58	60	61	60	2.74	54 - 65
	6.10	Spike Length - mm	83	92	95	86	96	87	93	88	94	86	87	87	84	91	86	95	86	92	86	88	89	3.90	83 - 96
	7.1	Lower Glume Width - mm	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	4.5	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.5	5.0	4.0	4.2	0.33	4.0 - 5.0
	7.2	Lower Glume Length - mm	20.0	18.5	20.0	16.5	20.0	18.0	18.5	16.0	18.0	22.0	20.0	21.0	17.0	17.0	22.5	18.0	19.0	17.0	20.0	17.0	18.8	1.79	16.0 - 22.5
GRANDIN	4.3	Flag Leaf Width - mm	15	17	16	15	15	16	16	15	15	17	17	15	16	15	15	15	17	16	15	16	16	0.78	15 - 17
	4.4	Flag Leaf Length - mm	259	246	244	292	242	235	236	237	248	262	260	235	228	242	266	240	245	247	257	236	248	14.34	228 - 292
	5.3	Plant Height - cm	90	92	94	91	90	98	90	90	94	97	94	95	95	90	95	93	93	89	93	94	93	2.48	89 - 98
	6.7	Awn Length - mm	63	60	50	55	69	59	53	61	63	61	58	60	52	58	61	54	55	61	63	57	59	4.43	50 - 69
	6.10	Spike Length - mm	86	81	79	82	83	78	84	85	72	73	80	90	82	93	78	74	81	89	82	82	82	5.26	72 - 93
	7.1	Lower Glume Width - mm	4.0	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	0.16	3.5 - 4.5
	7.2	Lower Glume Length - mm	11.5	10.5	11.5	11.5	12.0	12.5	11.5	11.0	10.0	12.0	13.0	10.5	12.0	12.0	11.0	12.0	13.0	11.5	10.5	13.0	11.6	0.85	10.0 - 13.0

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9800199

Variety DANDY - spring wheat

Exhibit B

Statement of Distinctness

Dandy can be distinguished from Grandin in that:

- juvenile growth is more erect than Grandin
- the flag leaf is shorter than Grandin
- the glaucausity of the lower side of the blade is stronger than Grandin
- the glaucausity of the flag leaf sheat is stronger than Grandin
- the glaucausity of the spikes is stronger than Grandin
- the yield is higher than Grandin
- thousand seed weight is higher than Grandin
- plant height is longer than Grandin
- resistance to mildew is higher than Grandin
- resistance to rust is lower than Grandin

	year	trials*	Dandy		Grandin	
			mean	range	mean	range
yield	1995	1	4273	---	3478	---
[g/plot]	1996	5	4288	3806-4744	3987	3589-4214
	1997	5	3657	3407-4207	3160	2909-3952
1000 seed weight	1995	1	43.2	---	40.8	---
[g]	1996	5	44.6	43.2-46.4	43.4	41.2-44.8
	1997	5	41.8	41.2-42.4	41.0	39.6-42.0
plant height	1995	1	93.0	---	80.0	---
[cm]	1996	4	95.0	90-100	86.3	80-90
	1997	5	85.8	77-90	85.3	82-87
mildew	1995	1	1.00	---	2.80	---
[0=resistant]	1996	5	0.00	0.0-0.0	1.00	1.0-1.1
	1997	4	0.13	0.0-0.5	4.38	4.0-5.5
rust	1995	---	---	---	---	---
[0=resistant]	1996	5	3.12	2.0-5.3	0.84	0.5-1.8
	1997	---	---	---	---	---
hectoliter-weight	1995	---	---	---	---	---
[g]	1996	2	72.6	72.4-72.7	71.8	71.7-71.8
	1997	5	73.3	72.6-74.0	74.7	74.0-75.4

* data collected at Harriston, Ontario, Canada
each trial with four replications

9800199

Sign-Test

method described in: GIBBON, J.D. : „Non-parametric methods for quantitative analyses" ; p. 94, Holt, Rinehart and Winston, 1976

Testcriteria:
- independent from the kind of distribution of the character
- also for small samples
- conservative in decision

trial no.	yield		tsw		height		mildew		rust		hectoliter	
	D	G	D	G	D	G	D	G	D	G	D	G
H0195	4273	3478	43.2	40.8	93	80	1.0	2.8	---	---	---	---
H0196	4344	3917	46.4	41.2	100	90	0.0	1.1	3.3	0.9	---	---
H0296	4343	4133	43.6	43.6	95	80	0.0	1.0	2.0	0.5	---	---
H0396	4203	4084	44.0	44.0	90	85	0.0	1.0	2.5	0.5	72.7	71.8
H0496	3806	3589	43.2	44.8	95	90	0.0	1.0	2.5	0.5	72.4	71.7
H0596	4744	4214	45.6	43.2	---	---	0.0	1.0	5.3	1.8	---	---
H0197	3577	2968	42.4	42.0	90	87	0.0	4.0	---	---	74.0	75.4
H0297	4207	3952	41.2	39.6	86	85	0.5	5.5	---	---	73.4	74.6
H0397	3518	3004	41.6	40.8	77	82	0.0	4.0	---	---	72.6	74.0
H0497	3577	2968	42.4	42.0	90	87	0.0	4.0	---	---	74.0	75.4
H0597	3407	2909	41.6	40.8	---	---	---	---	---	---	72.6	74.0
n (D-G≠0)	11		9		9		11		5		7	
z(D-G>0)	11		8		8		0		5		2	
$k_{0.05}$	2		1		1		2		0		0	
$z \geq n-k_{0.05}$	yes		yes		yes				yes			
$z \leq k_{0.05}$							yes				no	
$k_{0.01}$	1		0		0		1		sample size too small		0	
$z \geq n-k_{0.01}$	yes		yes		yes							
$z \leq k_{0.01}$							yes				no	

D = variety Dandy; G = variety Grandin
n = number of differences D-G≠0; z = number of differences D-G>0
$K_{0,05}$ = value from the binominal distribution with p=0.5 for $\alpha = 0.05$ and total number of differences n
if $z \geq n-k_{0.05}$ than Z(D-G)>0
if $z \leq k_{0.05}$ than Z(D-G)<0

all results from Harriston, Ontario, Canada out of the years 1995, 1996 and 1997
H0195 = mean from four replications from trial **01** in 1995 at Harriston

9800199

Results from sign-test :

Dandy is higher in yield, higher in thousand seed weight, longer, more resistant to mildew but more susceptible to rust than Grandin for α=0.05.

Dandy is higher in yield, higher in thousand seed weight, longer and more resistant to mildew than Grandin for α=0.01.

In hectoliter-weight no difference between Dandy and Grandin could be detected.

Tabelle 5: Quantile der Binominalverteilung (p = 1/2).

9800199

n \ α	0,005	0,01	0,025	0,05	0,1
4	–	–	–	–	0
5	–	–	–	0	0
6	–	–	0	0	0
7	–	0	0	0	1
8	0	0	0	1	1
9	0	0	1	1	2
10	0	0	1	1	2
11	0	1	1	2	2
12	1	1	2	2	3
13	1	1	2	3	3
14	1	2	2	3	4
15	2	2	3	3	4
16	2	2	3	4	4
17	2	3	4	4	5
18	3	3	4	5	5
19	3	4	4	5	6
20	3	4	5	5	6
21	4	4	5	6	7
22	4	5	5	6	7
23	4	5	6	7	7
24	5	5	6	7	8
25	5	6	7	7	8
26	6	6	7	8	9
27	6	7	7	8	9
28	6	7	8	9	10
29	7	7	8	9	10
30	7	8	9	10	10
31	7	8	9	10	11
32	8	8	9	10	11
33	8	9	10	11	12
34	9	9	10	11	12
35	9	10	11	12	13
36	9	10	11	12	13
37	10	10	12	13	14
38	10	11	12	13	14
39	11	11	12	13	15
40	11	12	13	14	15
41	11	12	13	14	15
42	12	13	14	15	16
43	12	13	14	15	16
44	13	13	15	16	17
45	13	14	15	16	17
46	13	14	15	16	18
47	14	15	16	17	18
48	14	15	16	17	19
49	15	15	17	18	19
50	15	16	17	18	19

Tabelliert sind α-Quantile binomialverteilter Zufallsvariabler X mit p = 1/2, d.h. die größten natürlichen Zahlen k_α mit

$$P(X \leqslant k_\alpha) = \frac{1}{2^n} \sum_{\nu=0}^{k_\alpha} \binom{n}{\nu} \leqslant \alpha.$$

Aus Symmetriegründen gilt

$$P(X \geqslant n - k_\alpha) = P(X \leqslant k_\alpha).$$

Für $n \geqslant 36$ gilt mit dem $(1-\alpha)$ – Quantil $z_{1-\alpha}$ der $N(0;1)$ – Verteilung die Näherung

$$\boxed{k_\alpha \approx \frac{n}{2} - 0{,}5 - \frac{\sqrt{n}}{2} z_{1-\alpha}}$$

table of the binomial distribution with p=0.5

from: Bosch K., "Einführung in die angewandte Statistik", 4rth edition, Braunschweig 1987

Tab. 4: Significance of examined charakters

	plant height				lenght of flag leaf			awn lenght		
	DF	MS	F-value	sign.	MS	F-value	sign.	MS	F-value	sign.
Varieties (Var)	1	105,85	293,02	*	2329,03	484,71	*	2471,05	>5000	**
Locations (Loc)	1	1,81	5,00	ns	141,12	29,37	ns	6,30	560,10	*
Var x Loc	1	0,66	1,83	ns	0,10	0,02	ns	1,36	121,00	ns
Years (Yrs)	1	0,32	0,89	ns	97,30	20,25	ns	1,45	128,44	ns
Var x Yrs	1	1,53	4,24	ns	47,05	9,79	ns	0,25	21,78	ns
Loc x Yrs	1	0,00	0,00	ns	2,53	0,53	ns	0,15	13,44	ns
Var x Loc x Yrs	1	0,36	—	—	4,80	—	—	0,01	—	—

Exhibit B AMA 19 dec 2000 per letter

98002

Tab. 1 Plant height (cm)

variety	character	year	locat.	measurements (cm)																				mean	total mean	variance	range
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
Dandy	plant	1996	loc 1	95	96	97	96	99	95	98	99	100	98	98	101	100	100	100	100	99	99	97	98	98,25		3,145	95-101
	height		loc 2	98	96	98	102	101	96	99	98	97	99	96	103	102	106	101	99	103	104	105	101	100,20		9,326	96-106
	cm	1997	loc 1	95	96	101	98	99	101	98	96	103	100	102	98	100	99	104	101	98	96	100	98	99,15		5,924	95-104
			loc 2	101	100	104	99	101	97	97	100	99	103	101	102	101	102	99	100	101	102	98	98	100,25	99,46	3,671	97-104
Grandin	plant	1996	loc 1	90	92	94	91	90	98	90	90	94	97	94	95	95	90	95	93	93	89	93	94	92,85		6,45	89-98
	height		loc 2	93	90	92	94	90	92	95	91	90	96	90	90	94	96	94	95	95	91	96	92	92,80		5,116	90-96
	cm	1997	loc 1	88	88	93	94	94	93	93	90	93	91	91	89	91	92	89	90	92	89	88	95	91,15		4,871	88-95
			loc 2	94	92	92	90	92	92	89	91	92	90	88	95	89	89	94	95	95	94	93	93	91,95	92,19	4,892	88-95

Tab. 2 Lenght of flag leaf (mm)

variety	character	year	locat.	measurements (mm)																				mean	total mean	variance	range
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
Dandy	flag leaf	1996	loc 1	230	212	195	216	196	228	226	235	209	205	235	218	210	199	232	229	231	216	236	227	219,25		183,039	195-236
	lenght		loc 2	210	239	235	223	238	242	234	237	202	219	225	220	230	206	239	242	220	212	242	225	227,00		161,684	202-242
	mm	1997	loc 1	200	230	222	237	214	200	235	218	214	205	226	233	234	216	238	230	230	217	202	218	220,95		156,787	200-238
			loc 2	220	239	240	223	212	242	228	215	245	240	230	238	242	239	210	223	225	235	225	220	229,55	224,19	118,997	210-245
Grandin	flag leaf	1996	loc 1	259	246	244	270	242	235	236	237	248	262	260	235	228	242	266	240	245	247	257	236	246,75		138,513	228-270
	lenght		loc 2	280	267	285	251	262	260	242	235	237	225	285	220	264	275	260	245	280	240	238	290	257,05		434,787	220-290
	mm	1997	loc 1	225	264	280	265	240	270	260	245	290	280	273	293	255	267	265	250	240	242	231	290	261,25		399,039	225-293
			loc 2	261	272	270	250	250	247	230	290	230	274	285	270	255	290	270	258	280	290	277	295	267,20	258,06	370,589	230-295

Tab. 3: Awn lenght (mm)

variety	character	year	locat.	measurements (mm)																				mean	total mean	variance	range
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
Dandy	awn	1996	loc 1	25	24	23	20	19	28	19	30	27	23	25	24	20	19	22	21	23	19	26	25	23,10		10,516	19-30
	lenght		loc 2	24	23	25	21	28	25	25	26	25	22	21	29	33	30	29	25	27	26	22	21	25,35		10,766	21-33
	mm	1997	loc 1	20	18	23	21	23	19	26	24	26	24	23	21	18	27	20	28	29	24	26	25	23,25		10,618	18-29
			loc 2	26	27	25	24	21	29	33	32	30	26	28	27	23	21	25	24	26	22	29	26	26,20	24,48	11,011	21-33
Grandin	awn	1996	loc 1	63	60	50	55	69	59	53	61	63	61	58	60	52	58	61	54	55	61	63	57	58,65		20,661	50-69
	lenght		loc 2	53	59	62	55	56	61	63	59	62	61	53	56	69	59	54	62	63	62	59	60	59,40		16,042	53-69
	mm	1997	loc 1	69	59	54	62	63	62	59	60	53	59	62	55	57	60	63	59	63	62	53	59	59,65		15,503	53-69
			loc 2	63	65	61	64	63	55	57	69	61	55	64	65	63	61	60	54	60	62	57	57	60,80	59,63	15,642	54-69

Exhibit 13 MAA 10 dec 2000 re letter

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9800199

Exhibit B: Novelty Statement:

Type :	spring wheat
Grain-Colour :	medium red
Shape :	midsize midlong, midwide, ovate to oval
Germ :	midsize, oval to round
Crease :	midwide, ~~skallour~~ to middeep
	few pitted shallow AAA 19 Dec 2000
Cheeks :	round to slightly rounded
Brush :	midsize, short to midlong

See Question 4

Exhibit C

EXHIBI
(Whea

COPY

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
[redacted]
BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S)
DR. PETER FRANCK

ADDRESS (*Street and No. or R.F.D. No., City, State, and Zip Code*)
PFLANZENZUCHT OBERLIMPURG DR. FRANCK
74523 SCHWABISCH HALL
GERMANY

FOR OFFICIAL USE ONLY

PVPO NUMBER 9800199

VARIETY NAME
DANDY
(SYNONYM FOR QUANTUM)

TEMPORARY OR EXPERIMENTAL DESIGNATION
SL93609

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. [ ][ ][ ] or [ ][ ]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____

Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

[1] 1=Common 2=Durum 3=Club 4=Other (SPECIFY) _____

2. VERNALIZATION:

[1] 1=Spring 2=Winter 3=Other (SPECIFY) _____

3. COLEOPTILE ANTHOCYANIN:

* [1] 1=Absent 2=Present

4. JUVENILE PLANT GROWTH:

[2] 1=Prostrate 2=Semi-erect 3=Erect

5. PLANT COLOR (boot stage):

[2] 1 = Yellow-Green 2 = Green 3 = Blue-Green

6. FLAG LEAF (boot stage):

[1] 1 = Erect 2 = Recurved * [1] 1 = Not Twisted 2 = Twisted

7. EAR EMERGENCE:

[ ][ ] Number of Days Earlier Than _____

[0][1] Number of Days Later Than GRANDIN

8. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

9. PLANT HEIGHT (from soil to top of head, excluding awns):

[0][5] cm Taller Than GRANDIN

[ ][ ] cm Shorter Than _____

48000M

Exhibit C (Wheat) 1

COPY

10. STEM:

A. ANTHOCYANIN [redacted]

[2] 1= Absent 2=Present

B. WAXY BLOOM

[2] 1=Absent 2=Present

C. HAIRINESS (last internode of rachis)

[1] 1=Absent 2=Present

D. INTERNODE (SPECIFY NUMBER) _____

[1] 1=Hollow 2=Semi-solid 3=Solid

E. PEDUNCLE

[2] 1=Absent 2=Present

[19] cm Length

11. HEAD (at Maturity):

A. DENSITY

[2] 1=Lax 2=Middense 3= Dense

B. SHAPE

[4] 1 = Tapering 2= Strap 3 = Clavate 4 = Other (SPECIFY) OBLONG

C. CURVATURE

[1] 1 = Erect 2 = Inclined 3 = Recurved

D. AWNEDNESS

[4] 1 = Awnless 2 = Apically Awnletted 3 = Awnleitted 4 = Awned

12. GLUMES (at Maturity):

A. COLOR

[2] 1 = White 2 = Tan 3 = Other (SPECIFY) _____

B. SHOULDER

[2] 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate

C. BEAK

[3] 1 = Obtuse 2 = Acute 3 =Acuminate

D. LENGTH

[2] 1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

E. WIDTH

[2] 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Wide (ca. 4mm)

. SEED:

A. SHAPE

[1] 1 = Ovate 2 = Oval 3 = Elliptical

B. CHEEK

[1] 1=Rounded 2=Angular

C. BRUSH

[2] 1=Short 2=Medium 3=Long

[1] 1 = Not Collared 2 = Collared

D. CREASE

[1] 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[1] 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

480044

13. SEED: (continued)

E. COLOR

[3] 1 = White 2 = Amber 3 = Red 4 = Other (SPECIFY) _____

F. TEXTURE

[1] 1=Hard 2=Soft

G. PHENOL REACTION *(see instructions)*:

[4] 1 = Ivory 2 = Fawn 3 = Light Brown 4 = Dark Brown 5 = Black

COPY

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

Stem Rust *(Puccinia graminis* f. sp. *tritici)* [0] _____

Stripe Rust *(Puccinia striiformis)* [0] _____

Tan Spot *(Pyrenophora tritici-repentis)* [4] _____

Halo Spot *(Selenophoma donacis)* [0] _____

Septoria nodorum (Glume Blotch) [4] _____

Septoria avenae (Speckled Leaf Disease) [0] _____

Septoria tritici (Speckled Leaf Blotch) [4] _____

Scab *(Fusarium* spp.) [2] _____

"Black Point" (Kernel Smudge) [0] _____

Barley Yellow Dwarf Virus (BYDV) [0] _____

Soilborne Mosaic Virus (SBMV) [0] _____

Wheat Yellow (Spindle Streak) Mosaic Virus [0] _____

Wheat Streak Mosaic Virus (WSMV) [0] _____

Other (SPECIFY) _____ [ ] _____

Other (SPECIFY) _____ [ ] _____

Other (SPECIFY) _____

Leaf Rust *(Puccinia recondita* f. sp. *tritici)* [4] _____

Loose Smut *(Ustilago tritici)* [2] _____

Flag Smut *(Urocystis agropyri)* [0] _____

Common Bunt *(Tilletia tritici* or *T. laevis)* [0] _____

Dwarf Bunt *(Tilletia controversa)* [0] _____

Karnal Bunt *(Tilletia indica)* [0] _____

Powdery Mildew *(Erysiphe graminis* f. sp. *tritici)* [2] _____

"Snow Molds" [0] _____

Common Root Rot *(Fusarium, Cochliobolus* and *Bipolaris* spp.) [2] _____

Rhizoctonia Root Rot *(Rhizoctonia solani)* [0] _____

Black Chaff *(Xanthomonas campestris* pv. *translucens)* [0] _____

Bacterial Leaf Blight *(Pseudomonas syringae* pv. *syringae)* [2] _____

Other (SPECIFY) _____ [ ] _____

Other (SPECIFY) _____ [ ] _____

Other (SPECIFY) _____ [ ] _____

Other (SPECIFY)

9800199

Exhibit C (Whea

COPY

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

Hessian Fly *(Mayetiola destructor)* [0] _____

Other (SPECIFY) _____ [ ] _____

Stem Sawfly *(Cephus spp.)* [0] _____

Other (SPECIFY) _____ [ ] _____

Cereal Leaf Beetle *(Oulema melanopa)* [0] _____

Other (SPECIFY) _____ [ ] _____

Russian Aphid *(Diuraphis noxia)* [0] _____

Other (SPECIFY) _____ [ ] _____

Greenbug *(Schizaphis graminum)* [0] _____

Other (SPECIFY) _____ [ ] _____

Aphids [0] _____

Other (SPECIFY) _____ [ ] _____

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

See Question 5: Milling and Baking Data
[Exhibit D]

ONTARIO HARD RED SPRING WHEAT REGISTRATION TEST - 1995

TWO YEAR AVERAGE (1994 -1995)

KERNEL CHARACTERISTICS

CULTIVAR	TEST WEIGHT	KERNEL WEIGHT	KERNEL HARDNESS	GRAIN PROTEIN	GRAIN ASH	FALLING NUMBER
CELTIC	79.1	30.7	50.2	14.43	1.78	375
OAC93SR.15	76.7	32.9	58.7	15.07	1.84	377
OAC93SR.13S	80.1	31.1	50.4	14.39	1.70	384
CM93609 (Dandy)	80.1	34.4	56.0	14.00	1.75	171

FLOUR CHARACTERISTICS

CULTIVAR	FLOUR YIELD	FLOUR PROTEIN	FLOUR ASH	FARINOGRAPH DATA ABSN	PK TM	STABIL	MTI	THD	LOAF VOLUME
CELTIC	74.4	13.23	0.46	61.1	6.3	12.1	24	61	914
OAC93SR.15	74.7	14.00	0.48	61.1	7.7	13.4	25	48	865
OAC93SR.13S	74.6	13.16	0.49	62.5	5.5	8.4	47	83	931
CM93609 (Dandy)	74.5	12.52	0.43	59.6	5.5	7.4	52	119	861

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1995 Quality Data for Ontario Registration Tests
L.N. Pietrzak/D. Flynn
Grain Quality Laboratory
Plant Research Centre, Agriculture Canada, Ottawa

ONTARIO HARD RED SPRING WHEAT REGISTRATION TEST - 1995

SUMMARY - KERNEL CHARACTERISTICS

CULTIVAR	GRADE [C.G.C.]	TEST WEIGHT	KERNEL WEIGHT	KERNEL HARDNESS	GRAIN PROTEIN	GRAIN ASH	FALLING NUMBER
A:							
CELTIC	2	79.1	31.3	48.4	14.41	1.78	387
OAC93SR.15	2	76.9	33.1	57.0	15.13	1.91	398
OAC93SR.135	2	80.1	31.9	47.5	14.35	1.72	396
CM93609 (Dandy)	2	79.7	35.4	53.9	13.81	1.74	193
OAC94SR.7	1	80.6	35.2	51.6	13.57	1.66	282
AW264	2	76.2	30.9	50.0	13.39	1.88	407
RL4719	2	76.9	28.8	55.6	14.97	1.71	380
WCM7	2	77.9	27.2	52.8	14.37	1.67	345
B:							
CELTIC	3	76.7	30.3	51.0	14.42	1.94	380
BS13.569.02	3	75.6	31.7	45.0	13.48	1.84	385
TEST MEAN		77.9	31.6	51.3	14.19	1.78	352
CWRW #1	1	84.3	30.2	52.0	11.00	1.62	300
CWRW #2	2	83.0	29.9	51.8	10.86	1.86	286
CWRS (12.5)	1	82.4	28.6	54.5	12.52	1.71	400
CWRS (13.5)	1	83.7	28.4	52.4	13.41	1.65	431
CWRS (14.5)	1	83.3	29.7	55.0	15.10	1.72	455

C.G.C. - CANADIAN GRAIN COMMISSION
A: - four locations bulked to give a composite: Elora, Ottawa, Harriston and Winthrop
B: - two locations bulked to give a composite: Winthrop and Nairn

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Plant Research Centre, Agriculture Canada, Ottawa

ONTARIO HARD RED SPRING WHEAT REGISTRATION TEST - 1995

SUMMARY - FLOUR CHARACTERISTICS

CULTIVAR	FLOUR YIELD	FLOUR PROTEIN	PROTEIN DIFFER	FLOUR ASH	FARINOGRAPH DATA ABSN	PK TM	STABIL	MTI	THD	LOAF VOLUME
A:										
CELTIC	75.0	13.06	1.35	0.49	61.1	5.1	12.1	21	60	897
OAC935R.15	75.9	13.86	1.27	0.52	61.1	7.5	13.8	22	35	917
OAC93SR.13S	75.0	12.97	1.38	0.50	62.6	5.2	7.2	40	70	912
CMS3609 (Dandy)	75.3	12.38	1.45	0.43	59.5	5.0	8.4	34	105	840
OAC94SR.7	74.0	12.61	0.96	0.48	64.1	4.0	3.1	82	150	775
AW264	72.3	12.35	1.04	0.52	61.5	5.0	9.5	38	60	860
RL4719	76.5	13.51	1.46	0.45	60.5	6.1	12.0	33	40	917
WCM7	75.5	12.94	1.43	0.46	60.1	5.7	13.2	27	50	857
B:										
CELTIC	74.2	12.97	1.45	0.50	61.7	6.1	12.2	28	55	900
BS13.569.02	72.4	12.02	1.45	0.48	63.2	3.9	11.1	21	60	880
TEST MEAN	74.6	12.86	1.32	0.48	61.5	5.4	10.2	34	68	875
CWRW #1	76.7	9.90	1.10	0.43	54.3	6.2	9.4	46	70	710
CWRW #2	77.3	9.70	1.07	0.42	54.0	5.8	7.6	62	85	735
CWRS (12.5)	75.5	11.66	0.86	0.45	61.4	5.8	7.9	40	75	815
CWRS (13.5)	75.0	12.64	0.77	0.47	63.1	5.1	7.4	34	70	865
CWRS (14.5)	75.2	14.19	0.81	0.47	62.9	7.0	10.3	33	50	955

A: - four locations bulked to give a composite: Elora, Ottawa, Harriston and Winthrop
B: - two locations bulked to give a composite: Winthrop and Nairn

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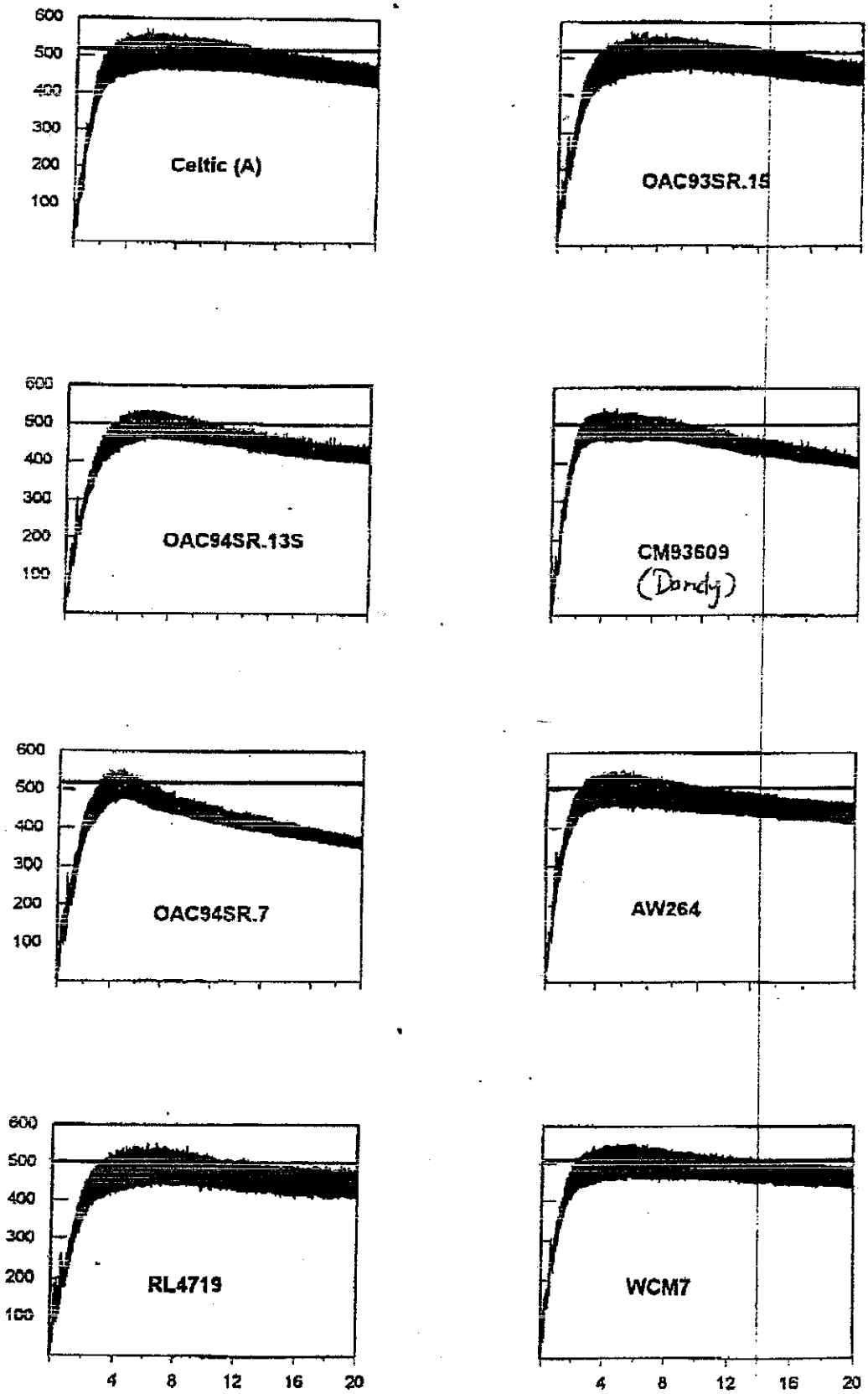
Grain Quality Laboratory
Plant Research Centre, Agriculture Canada, Ottawa

Ontario Hard Red Spring Wheat Registration Test - 1995
Farinograms



RE[illegible] LOCALLY. *Include form number and date on all reproductions.* F[illegible]VED - OMB NO. 0581-0055 EXPIRES: 12-31-96

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
[illegible]CIENCE AND TECHNOLOGY DIVISION - PLANT VARIETY PROTECTION OFFICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The follov[illegible]ents are made in accordance with the Privacy Act of 1974 (5 U.[illegible]52a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Dr. Peter Franck		Dandy (Synonym for Quantum)

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*	5. TELEPHONE *(include area code)*	6. FAX *(include area code)*
Pflanzenzucht Oberlimpurg, Dr. Franck D-74523 Schwabisch Hall Germany	49 791-21-01	49 791-47-333
	7. PVPO NUMBER 9800199	

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* If no, please explain. [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company?
If no, give name of country Germany [ ] YES [X] NO

10. Is the applicant the original breeder? If no, please answer the following: [X] YES [ ] NO

a. If original rights to variety were owned by individual(s):
Is (are) the original breeder(s) a U.S. national(s)? If no, give name of country _____

b. If original rights to variety were owned by a company: [ ] YES [ ] NO
Is the original breeder(s) U.S. based company? If no, give name of country _____

11. Additional explantion on ownership *(If needed, use reverse for extra space):*

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original breeder, both the original breeder and the applicant must meet one of the above criteria.

The original breeder may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

Public reporting burden for this collection of information is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Officer, OIRM, AG Box 7630, Jamie L. Whitten Building, Washington, D.C. 20250. When replying, refer to OMB No. 0581-0055 and form number in your letter.

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9800199

Exhibit E : Statement of the Basis of Applicant's Ownership

The variety for which Plant Variety Protection is hereby sought is owned by

Dr. Peter Franck