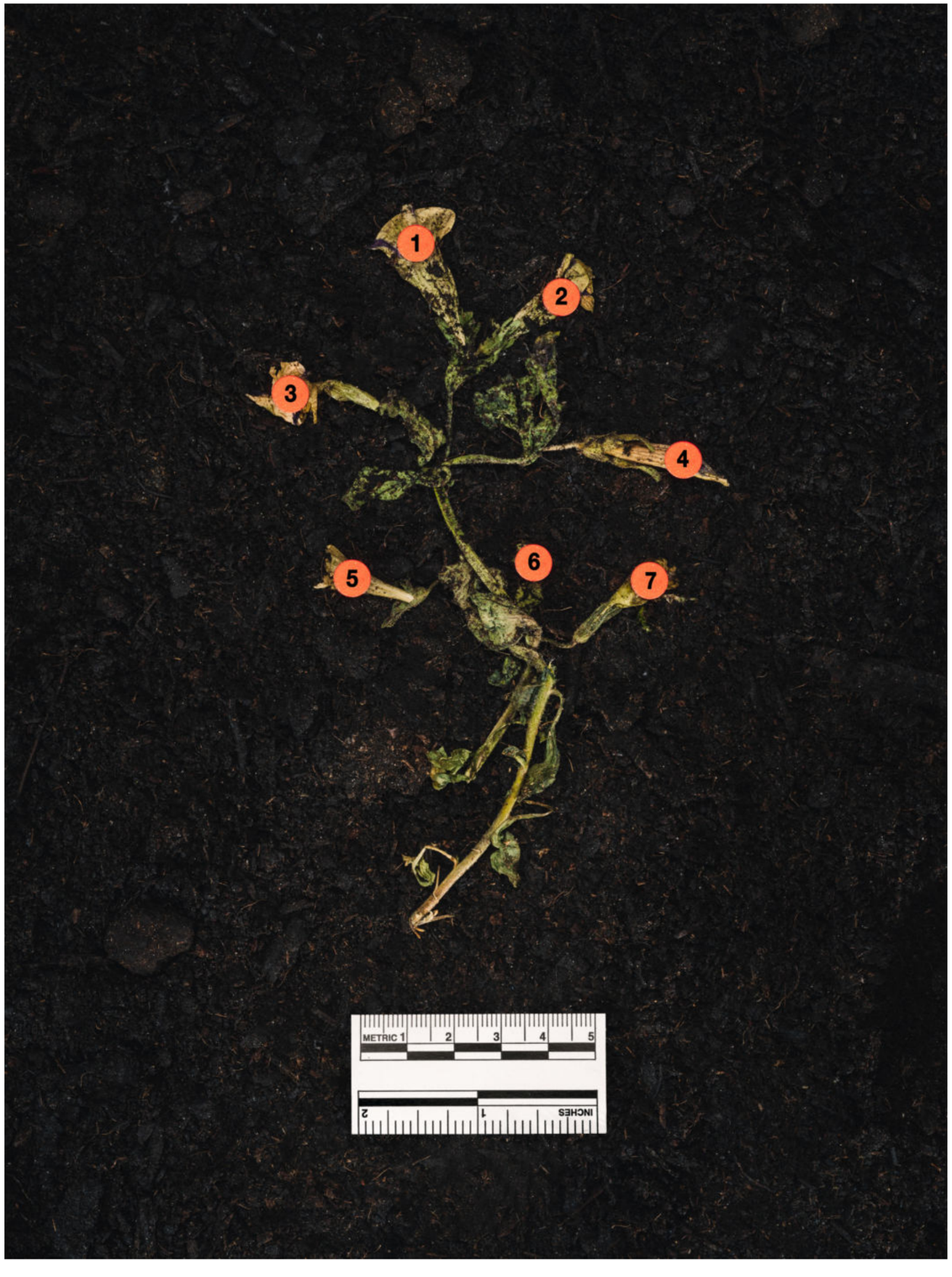
The Petunia Carnage

Klaus Pichler


Petunia


1
2
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METRIC 1 2 3 4 5
INCHES 1 2


BUG-SCAN®
BUG-SCAN®

STANDARD COLORS

INTERNATIONAL
FLOWER COLORS

BASED ON TRADE NAMES

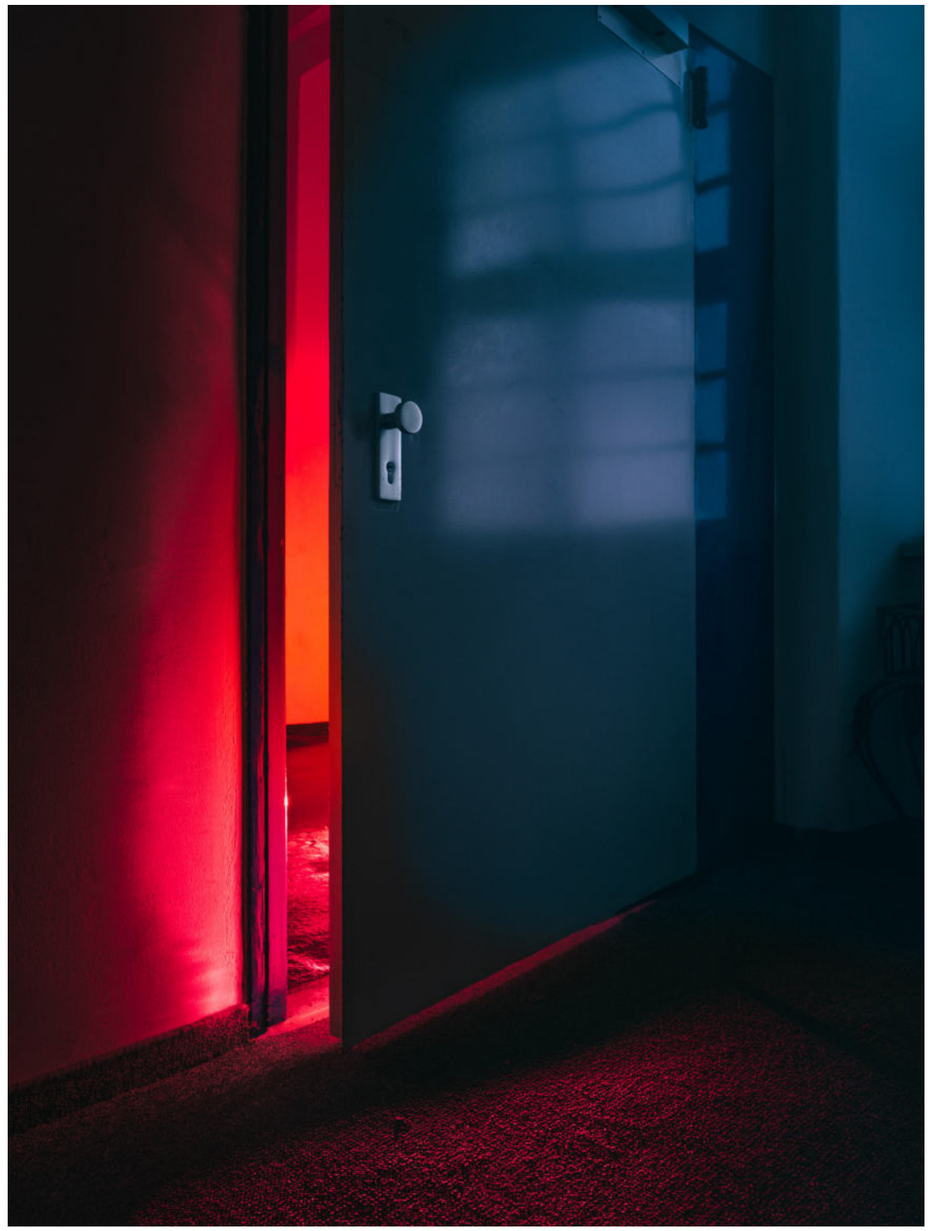
ACCORDING TO THE INTERNATIONAL STANDARD GUIDELINES FOR BOTANICAL CRIMINAL INVESTIGATIONS, CONFÈRENCE DE PARIS, 1993

Alaska Tan	Lady Slip Pink	Rosé Pink	Morning Glory	Pale Suede Shoes
Salmon Ray	Freaky Fuchsia	Hot Rod Pink	Raspberry Blast	Pink Torch
Raging Bull	Bloom!	Shallow Purple	Cherry Cheesecake	Deep Purple
Whispering Salmon	Mermaid [illegible]tic	[illegible] Friendship	Salmon Lips	Deeper Purple
Boiling Point	Electric Apricot	Whisky Hangover	Faded Picture	Suntanned Butter
Maniac Pink	Fire Blitz	[illegible]ragons Blood	Mustard	Honey Burn
Confetti Twist	Soaked Band Aid	Bath Salt	Practical [illegible]	Chicken Nuggets
Drought	Rusty Water	Old Potatoes	African Sunset	Flamingo
Trump	Construction Cone	Kardashian	Coral Blast	Crazy Fun
Ginger Pubic	Great Peach	Code Bread	Brown Thumb	Hells Bells
Thoughts & Prayers	Salmon Red Vein	Hugs & Kisses	Sore Red	Rosé Blast Charm
Invisible Oranges	Color My Sunset	Angry Goldfish	Burning Heart	Liver Pool
Fire Chief	Forest Fire	Medium Rare	Hangover Eyes	Merlot Teeth

TABLE 32: SALMON, CORAL, ORANGE No.2


DAILY Mirror
May 18, 2017
SUN OF A BEACH, IT'S GETTING HOT!
MON 32
TUE 33
WED 30
THUR 39
FRI 33
WHO WOULD DO THAT?
POLICE REPORTS:
MYSTERIOUS
PETUNIA MURDERS
STUDY REVEALS:
A NUCLEAR EXPLOSION WOULD BE A DISASTER
WIN
€15K
JUST KIDDING
MY HUSBAND ATE MY HAMSTER
THIS IS HOW HE ROLLS
REPORT PAGES 7-8
CRIME SCENE
HAVE YOU SEEN SOMETHING SUSPICIOUS?


THE Sun
25c
Friday, Sept. 27th, 2017
The truth and nothing but the truth for 60 years
FLORAL MASS MURDER
EXCLUSIVE REPORT
VICTIMS FOUND ALL OVER THE WORLD!
GARDENERS SHOCKED: 'THIS IS THE END!'
PETUNIA CARNAGE!
THE ONLY PAPER WITH THE FULL SHOCKING STORY




42


Petunia
HYBRIDA

„Two years ago, plant biologist Teemu Teeri was walking by a train station in Helsinki when he noticed some vivid orange petunias in a planter. The flowers reminded Teeri, who has studied plant pigments at the University of Helsinki, of blooms created in a landmark gene-engineering experiment some 30 years earlier. As far as he knew, those flowers never made it to market. But he was curious, and he stuck a stem in his backpack.“

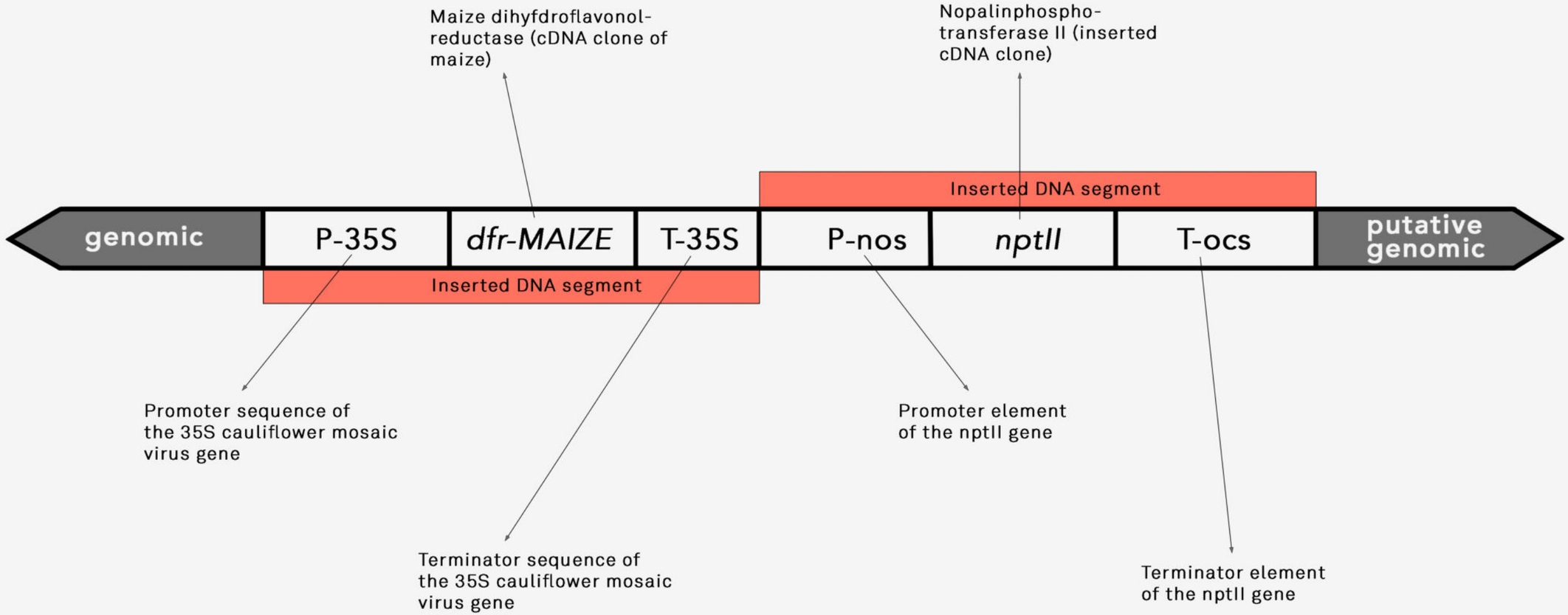
Kelly Servick

in: Science Magazine, May 24, 2017


Y000009242
= Petunia hybrida =
607340 -
180/108
04/046
Scientific Name: Petunia hybrida ,Afric
Family: Solanaceae
Location: Helsinki Rautatientori (Helsi
Station), planter at central square
Description: orange/salmon petals, herb
stem and leaves green


BOSCH
BZ U125
Heraeus
INSTRUMENTS
WX Ultra 80

University of Helsinki
Sept. 14th, 2015



Description:
Genomic DNA was isolated from leaves from 5 orange petunia plants (location: Helsinki main station, collected by Prof. Teemu Teeri) using the miniprep II method. Amplified fragments were purified using the High Pure PCR Product Purification Kit and directly sequenced using the amplification primers and internal primers designed from the sequences.

Results:
The PCR analysis shows that the analyzed plants contain foreign DNA segments. Most likely the foreign genes affect the flower color of the plants, producing vivid orange blooms. The inserted genes of the plants suggest they were genetically engineered (GE). The regulatory status and a possible connection with transgenic petunia experiments in Cologne in 1990 are subject of further examination.

THE FUTURIST PLANT

Mutant Petunias join the wild bunch in Germany. The authorities in West Germany have approved for the first time an outdoor experiment with genetically engineered organisms.

The West German comittee on recombinant DNA technology cleared the Max Planck Institute for Plant Breeding in Cologne to release 37 000 genetically modified petunias.

There is no law in West Germany governing the release of genetically modified organisms, but scientists are forced to request permission from the rDNA committee if they wish to undertake such experiments. The petunias are the first organisms containing recombinant DNA that the committee has reviewed for approval. The West German Drug Licensing Authority must ratify the decision before the experiment proceeds, however.

Heinz Saedler, head of the team that produce the petunias, said last week: "Of course we are doing the experiment only for scientific reasons. But we are fully aware that this is the first case in Germany, and we think it is important, not only to talk about the deliberate release, but also to gather experience with such things."

Images courtesy of A rchive of the Max-Planck-Society, Berlin-Dahlem

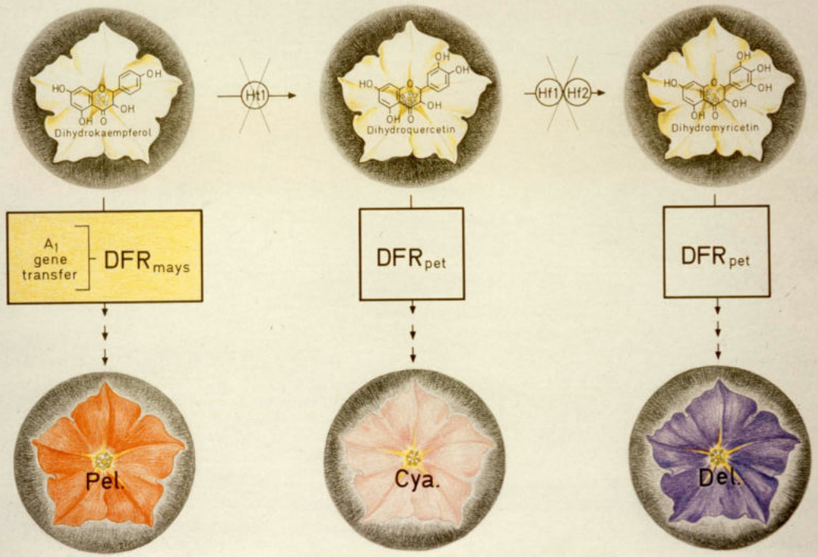
Saedler and colleagues will plant the petunias on 5000 square metres at the institute. The experiment is designed to observe and capture "jumping genes", segments of DNA that can move about within the genome of petunias. They occur in all organisms, but they are difficult to isolate except in maize, where they have been well studied.

The team in Cologne wants to see whether jumping genes in maize resemble those in distantly related plants, such as the petunia. First, they will insert A-1, a conventiuonal gene from maize, into the genes of white petunias. The A-1 gene codes for an enzyme which makes a pigment that will turn the petunia flowers in a color between salmon and orange.

"In principle, this experiment could be done in a greenhouse" says Saedler, "But the space in our greenhouse is very limited and a new facility will cost about a million Deutschmarks {S 380 000}.

CONT
OVER

A new petunia variety made by gene transfer



SCIENCE

Protesters hinder petunia experiments

Rolf Hell and Debra MacIntosh

THE first ever outdoor experiment with genetically engineered petunias, taking place in Cologne, West Germany, has started recently and one fact is becoming obvious: the scientific value of genetic plant experiments is not justified by the public.

The experiment, where 37 000 transgenic petunias were released at Max Planck Institute for Plant Breeding, was accompanied by protests from the very beginning and faced some major difficulties when acts of civil disobedience began to take over.

On May 14th, 1990, the first day of the experiment, some 200 protesters blocked the doors of the institute, demanding the immediate stop of the scientific study. The protests were organized by an initiative called *‚Bürger beobachten Petunien'* (*'citizens observe petunias'*), which was formed from local citizens, anti GE-activists and members of nationwide eco-activist groups.

Gregor Bornes, spokesperson of the initative, stated that *‚the gene-tinkerers are obviously trying to achieve some acceptance of genetic experiments by the use of neat balcony plants'* and claimed that the experiment could probably have a locomotive function for other experiments *‚without any knowledge of the long-term effects of the petunia experiment'*. Bornes stated that he fears this *‚scientific, small scale experiment will be licensed to commercial, large-scale companies, ultimately leading to a massive monopolization of the global seed industry by the use of patented transgenic seeds.'*

The blocking of the institutes' doors was just the prelude to a series of activism against the experiment. Prof. Heinz Saedler, the scientific head of the institute, states that *‚the situation had been heated and the police wanted to take drastic measures, but we were against that. We did not want to make a war out of it'*. Ultimately, he had to be placed under police protection for some days after receiving threats.

Now, nine weeks after the start of the experiment, the activists are continuing their protests, but their means have shifted: they are focusing on actions addressing the local and nationwide media. For example: on the night of May 24th, a group of unknown persons dressed in tracksuits climbed over the fence of the institute and planted regular, non-transgenic petunias between the transgenic plants in order to sabotage the experiment. They photographed their action and sent a letter of confession to the press where they called themselves the ‚gene joggers' and demanded the stop of the petunia experiment and on all scientific actions involving gene technology.

Despite actions like those are to be taken with a grain of salt, they are nevertheless a sign of unease in public opinion on genetic experiments. The public disapproval of genetic research shows that it appears as a threat, not as a chance and that there's a long way to go until the voices of concern will fall silent. However, the research on genetics has sparked controversy from the start and it appears it is more of a delicate issue than ever. □

DDR: EIN STAAT STIRBT

Marx und Engels schwärmten davon: vom Absterben des Staates. Ein in ihrem Namen gegrün... die DDR, ist bald tot. Klassikerzitate und aktuelle Beobachtungen von Ute Scheub

AUF SEITE 6

Angriff auf Gen-Petunien

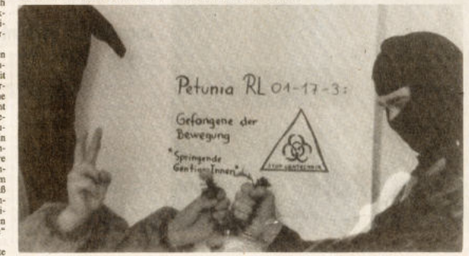
Unbekannte „Jogger" stiegen im Kölner Max-Planck-Institut über den Zaun

Berlin (taz) — Gen-Kritiker haben vergangene Woche versucht, das Petunien-Genexperiment des Kölner Max-Planck-Instituts für Züchtungsforschung zu zerstören. Eine Gruppe von unbekannten „Gen-Joggern" war über den Zaun geklettert, um den Genforschern „mit einigen hübschen, nicht manipulierten Balkonpflänzlein einen Strich durch die Rechnung" zu machen. Die Aktion richtet sich gegen die erste Freisetzung von genmanipulierten Organismen in der BRD.

„Heute haben wir den wilden Auswüchsen des Züchtungsinstitutes einen Besuch abgestattet, damit sich die hinter automatisch verschließbaren Türen verborgene Wissenschaft unserer Kritik nicht entziehen kann", heißt es in dem Bekennerbrief der Akteure. Die Besucher hinterließen nicht nur ein Transparent auf dem Acker, sondern setzten auch gezielt mehrere weiße Petunien zwischen die genmanipulierten Pflanzen. Bei dem Experiment spielt die Farbe Weiß eine entscheidende Rolle: Die Gentechniker hoffen nämlich, daß einige der lachsroten genmanipulierten Petunien durch „springende Gene" in die Farbe Weiß umschlagen.

Das Max-Planck-Institut erklärte gestern, die ausgesetzten Petunien seien zu identifizieren und würden „vom Gärtner ausgerupft". Dem Institut sei kein Schaden entstanden. Die Unterscheidung sei möglich, weil bei den genmanipulierten Pflanzen nur einzelne Blüten weiß blühen, bei den neu ausgesetzten Petunien dagegen die ganze Pflanze, so Christoph Meyer, der administrative Institutsleiter. Im MPI wird jetzt diskutiert, ob zusätzliche Sicherheitsmaßnahmen notwendig sind. Polizeipräsenz will man aber vermeiden: „Wir sind ein Forschungszentrum und kein KZ", sagte Meyer wörtlich. *-man-*

Dokumentation auf Seite 10



Wir dokumentieren: das Bekennerfoto der „Springenden GentigerInnen". Foto: Eingesandt

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Uneinig w
ner auch in de.
schaftshilfe für die S.
Während Bonn und Paris ba...
maßnahmen drängten, forderte
Thatcher zunächst eine Untersu
chung der Probleme. So wird die
EG-Kommission auf dem römi
schen Gipfel im Oktober zunächst
zwei Berichte über die Wirtschafts
lage in der UdSSR und über mögli
che Hilfsprogramme vorlegen.
Thatcher sagte, daß „die Finanzhil
fe mit der Forderung nach einer wirt
schaftlichen Neuordnung ver
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doch
weite
warte
minister
ker Befür
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Ende der
werteten d
persönliche
dagegen die
rungen, in des
Antisemitismus,
lichkeit sowie die
lungspolitik verurte
Siehe Tagesthe

Ein Korb für die E
Washinter der E-Kuhstec.
Vegetarische „Versu
Studie in China zeigt: Fleischn
Keine Verlierer in Afgh
Nadschibullahbeweist Verhandl
Als die Siegessäule noch n
Neues über Berlin aus der alten Garte

Cages Europeras ... 16 1000
Schriftverkehr ..... 18 Sehr

GENTECHNIK

Protestaktion vor dem Kölner Testgelände: „Arroganz der Forscher"

Aktion Petunie
Letter of Confession

Today, as part of the popular sport of gene jogging, we physically overcame the fence of the Max-Planck-Institute to get to the place of reprehension: the first release of genetically engineered organisms in the form of genetically modified plants.

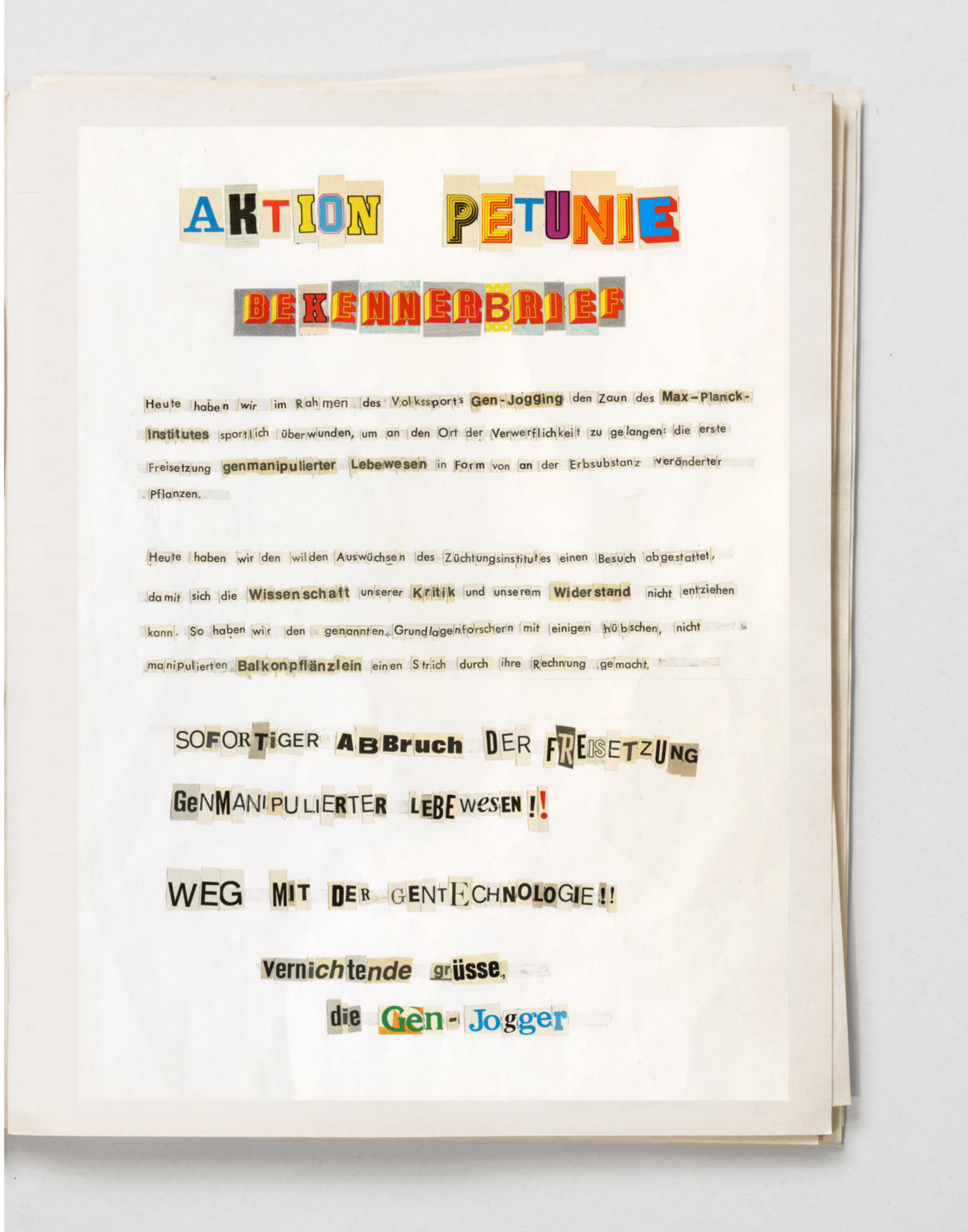
Today we paid a visit to the wild growths of the breeding institute so that science cannot escape our criticism and our resistance. So we thwarted the plans of the so-called basic researchers with some pretty, not manipulated balcony plants.

Immediate termination of the release of genetically modified organisms!

Away with genetic engineering!

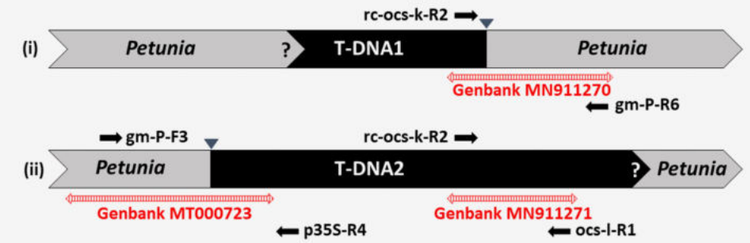
Destructive greetings,

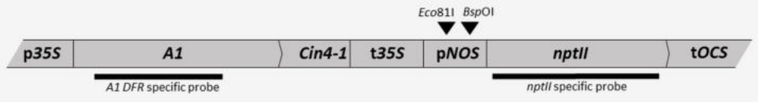
the gene joggers

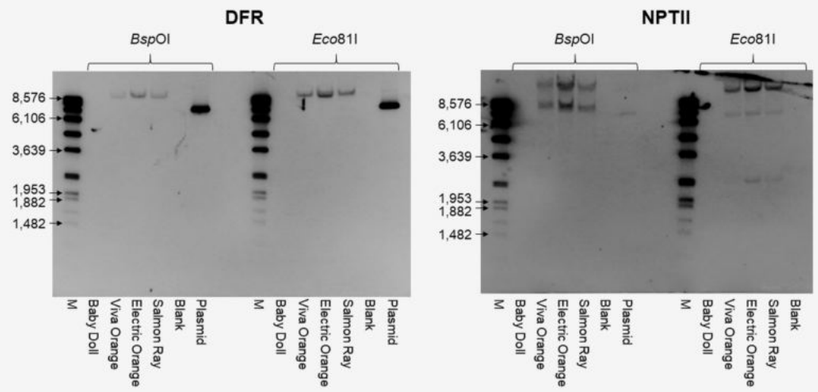


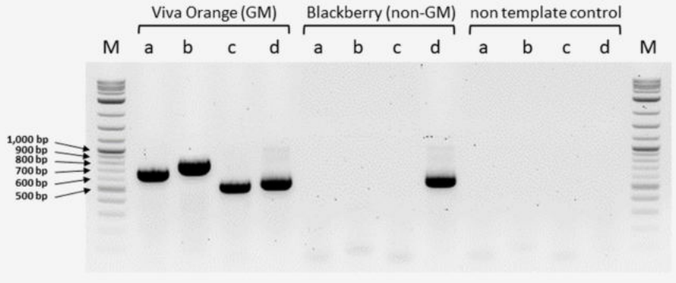

PETUNIA
,BONNIE ORANGE'
99c
Large flowered plants, annual
GARCHING SEEDS Co.
PEGASUS ORANGE MORN
PETUNIEN
HÄNGEPETUNIE, REICHBLÜHEND
NETTO
400 MG
DM
0,99
UVP.
STAR
SCHUTZMARKE
---------- GÜTEKLASSE A ----------


No. 556
VAN DIJK LITHO B.V.
MADE IN THE NETHERLANDS
ZAAD
UNION
VERPAKT
VOOR
1993
PETUNIA
Sanguna Salmon
NT.
WT.
4.5 g
1,40
NLG
LEKKER BLOEMEN
SM
SUPERMINZI SEED CO.
PETUNIA
'African Sunset'
4516 HALF HARDY ANNUAL
SPECTACULAR NEW COLOR
17,7g / 1oz.

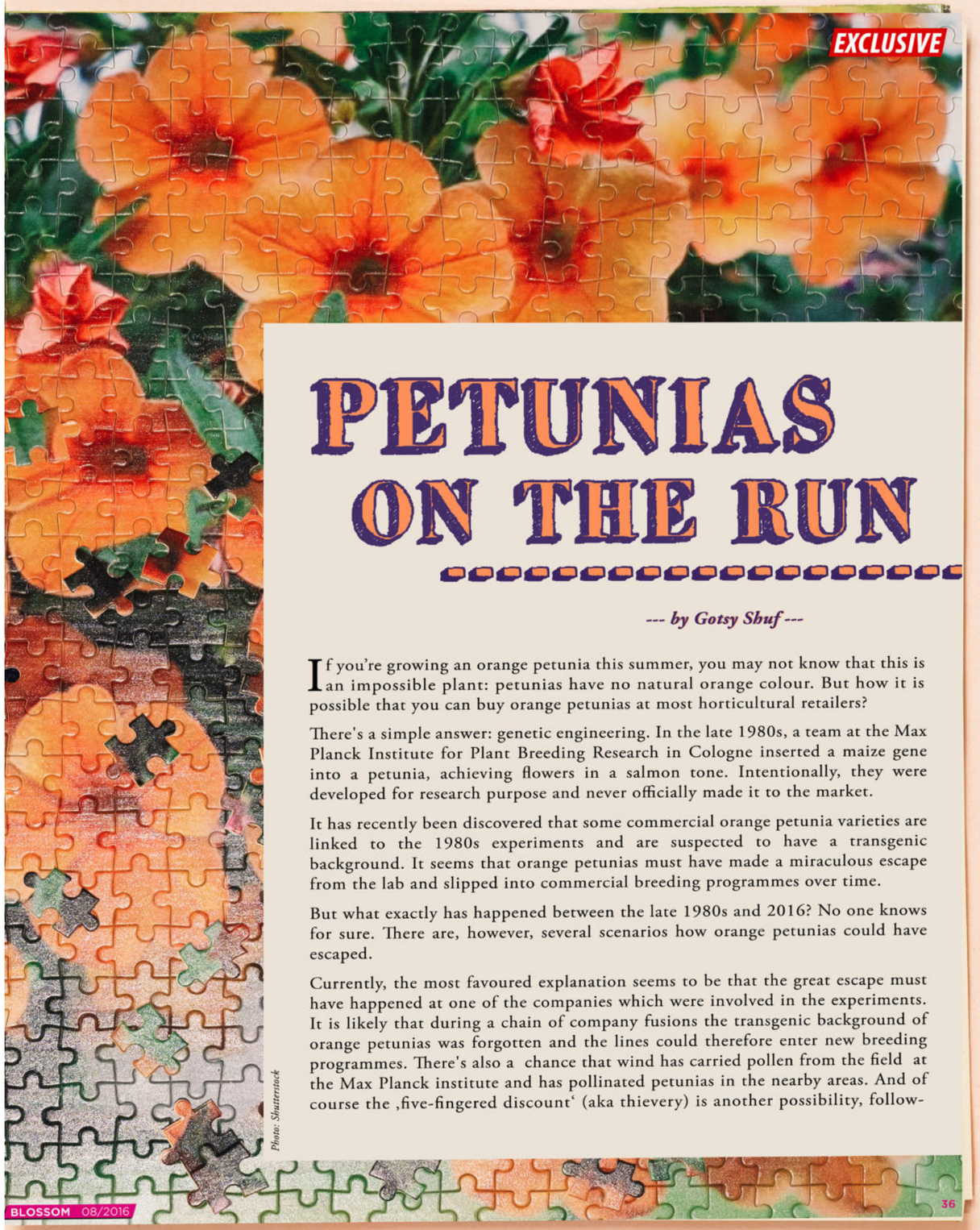

rc-ocs-k-R2
(i)
Petunia
?
T-DNA1
Petunia
Genbank MN911270
gm-P-R6
gm-P-F3
rc-ocs-k-R2
(ii)
Petunia
T-DNA2
?
Petunia
Genbank MT000723
Genbank MN911271
p35S-R4
ocs-I-R1


Eco81I
BspOI
p35S
A1
Cin4-1
t35S
pNOS
nptII
tOCS
A1 DFR specific probe
nptII specific probe


DFR
NPTII
BspOI
Eco81I
8,576
6,106
3,639
1,953
1,882
1,482
M
Baby Doll
Viva Orange
Electric Orange
Salmon Ray
Blank
Plasmid


Viva Orange (GM)
Blackberry (non-GM)
non template control
M
a
b
c
d
1,000 bp
900 bp
800 bp
700 bp
600 bp
500 bp


b)
rc-ocs-k-R2 CTGATTGTACCCTACTACTTATATGTACAA
5′-TATATCACCGTTACTATCGTATTTTTATGAATAATATTCTCGTTTCAATTTACTGATTGTACCCTACTACTTATATGTACAATATTAAAATGAAAACAA-3′
3′-ATATAGTGGGCAATGATAGCATAAAAATACTTATTATAAGAGGCAAGTTAAATGACTAACATGGGATGATGAATATACATGTTATAATTTTACTTTTGTT-5′
5′-TATATTGTGCTGAATAGGTTTATAGCGACATCTATGATGGAAAGATTGAATATCTTTATATTACTACAATAAAATTGGGTAAGAAATATGTACATGAAAA-3′
3′-ATATAACACGACTTATCCAAATATCGCTGTAGATACTACCTTTCTAACTTATAGAAATATAATGATGTTATTTTAACCCATTCTTTATACATGTACTTTT-5′
5′ T-DNA1 ↔ Petunia DNA
5′-GTTATCTTCATTTTCCTCCGGCTTGTACTACACAAGTATTAGCATGGTTGAATCACATGCGATTGTAAACAAGAAGTTTACTAATCCAAATGATTTTAAT-3′
3′-CAATAGAAGTAAAAGGAGGCCGAACATGATGTGTTCATAATCGTACCAACTTAGTGTACGCTAACATTTGTTCTTCAAATGATTAGGTTTACTAAAATTA-5′
5′-ATTTGGCATGACCGGTTGGGCCATCCCGGTTCTAATATGATGCGCAAAATAATTGAGAGTTCACATGGACATTCATTGAAGAACCAGAAGATTCTTCAAT-3′
3′-TAAACCGTACTGGCCAACCCGGTAGGGCCAAGATTATACTACGCGTTTTATTAACTCTCAAGTGTACCTGTAAGTAACTTCTTGGTCTTCTAAGAAGTTA-5′
5′-TTAAGGAATTCTCTTGTGCTGCATGTTCTCAAGGCAAATTAATTACTAGACCATCAGCAACTAAAGTAGGGATTGAATCCCCTGCATTTCTGGAACGTAT-3′
3′-AATTCCTTAAGAGAACACGACGTACAAGAGTTCCGTTTAATTAATGATCTGGTAGTCGTTGATTTCATCCCTAACTTAGGGGACGTAAAGACCTTGCATA-5′
5′-ACAAGGTGATATATGTGGGCCTATTCACCCACCATGTGGACCATTTAGATATTATATGGTTTTAATAGATGCATCAACAAGGTGGTCACATGTATGTTTA-3′
3′-TGTTCCACTATATACACCCGGATAAGTGGGTGGTACACCTGGTAAATCTATAATATACCAAAATTATCTACGTAGTTGTTCCACCAGTGTACATACAAAT-5′
5′-TTATCAACTCGCAACTTGGCATTTGCGAGATTGCTTGCTCAAATAATAAGATTAAGAGCACAGTTTCCAGATTATGCAATTAAGACAATTCGTCTTGATA-3′
3′-AATAGTTGAGCGTTGAACCGTAAACGCTCTAACGAACGAGTTTATTATTCTAATTCTCGTGTCAAAGGTCTAATACGTTAATTCTGTTAAGCAGAACTAT-5′
5′-ATGCTGGTGAGTTCACATCTCAAGCCTTTGATGACTACTGTATGTCAACTGGAATAACAGTGGAA-3′
3′-TACGACCACTCAAGTGTAGAGTTCGGAAACTACTGATGACATACAGTTGACCTTATTGTCACCTT-5′
CCACTCAAGTGTAGAGTTCGGAAACTACTG gm-P-R6



EXCLUSIVE

PETUNIAS ON THE RUN

--- by Gotsy Shuf ---

If you're growing an orange petunia this summer, you may not know that this is an impossible plant: petunias have no natural orange colour. But how it is possible that you can buy orange petunias at most horticultural retailers?

There's a simple answer: genetic engineering. In the late 1980s, a team at the Max Planck Institute for Plant Breeding Research in Cologne inserted a maize gene into a petunia, achieving flowers in a salmon tone. Intentionally, they were developed for research purpose and never officially made it to the market.

It has recently been discovered that some commercial orange petunia varieties are linked to the 1980s experiments and are suspected to have a transgenic background. It seems that orange petunias must have made a miraculous escape from the lab and slipped into commercial breeding programmes over time.

But what exactly has happened between the late 1980s and 2016? No one knows for sure. There are, however, several scenarios how orange petunias could have escaped.

Currently, the most favoured explanation seems to be that the great escape must have happened at one of the companies which were involved in the experiments. It is likely that during a chain of company fusions the transgenic background of orange petunias was forgotten and the lines could therefore enter new breeding programmes. There's also a chance that wind has carried pollen from the field at the Max Planck institute and has pollinated petunias in the nearby areas. And of course the ‚five-fingered discount' (aka thievery) is another possibility, follow-

Photo: Shutterstock

When plant scientist Teemu Teeri got the results from the DNA tests and found out the orange petunias were transgenic, he made a decision he now regrets. He shared his finding with a former student, employed at at the Finnish Board for Gene Technology. "I should have asked a hypothetical question" about what would happen if regulators discovered transgenic petunias that had not gone through the proper regulatory channels, he says.

Then things got out of hand: on April 27, 2017, Finland's food safety body issued a statement. They called for eight petunia varieties to be removed from the market. Other European nations also began investigations.

By May, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) was on alert: It worked with breeders to analyze suspect petunias' DNA. By October, 2017 the agency had confirmed more than 70 petunia varieties to be transgenic. It suggested several different ways to destroy them, including incinerating them, burying them, and putting them in bags in a landfill. Seed companies, flower breeders and retailers uprooted, disposed and burned petunias from their breeding programs and stocks. That's how the transgenic petunia carnage of 2017 began.

Kelly Servick

adapted from: Science Magazine, May 24, 2017

United States Department of Agriculture

Animal and Plant Health Inspection Service

Biotechnology Regulatory Services

4700 River Road
Unit 91
Riverdale, MD
20737-1236

October 18, 2017

APHIS Guidance Regarding the Destruction of Potential Genetically Engineered Petunias

BRS has learned that GE petunias have been imported, distributed, and grown in the United States without appropriate authorization. GE petunias are regulated articles.

This document serves as guidance to industry regarding how to destroy GE and potential GE petunias.

Any of the following methods may be used to destroy potential GE petunia plants if no seed are present:

- Double-bagged and incinerated
- Burial under a minimum of one (1) foot of soil
- Autoclaving
- Composting, using a managed composting protocol

Any of the following methods may be used to destroy GE petunia seed:

- Grinding
- Autoclaving
- Burial under a minimum of one (1) foot of soil

[redacted] Ph.D.
APHIS Deputy Administrator
Biotechnology Regulatory Services
Animal and Plant Health Inspection Service
United States Department of Agriculture

10/18/2017
Date


List of GE Petunia Varieties Requiring Import Authorization, APHIS, Updated 3. Oct. 2017
1 • 07336 Orange Yellow Centre 749
2 • 2016 FS Gold
3 • African Sunset
4 • Amore Mio
5 • BigDeal Freaky Fuchsia
6 • BigDeal Salmon Shimmer
7 • Bingo Coral Blast
8 • Bingo Mandarin
9 • Bingo Orange
10 • Bingo Orange Morn
11 • Bonnie Orange
12 • Bonnie Orange
13 • Bonnie Red 14
14 • Capella Red
15 • Cascadia Red Lips
16 • Cascadias Simply Red
17 • Charms Flame 2-140
18 • CO5369
19 • ColorBlitz Bright Red
20 • ColorBlitz Fire
21 • ColorBlitz Pink Morn
22 • Colorworks Homare
23 • Confetti Garden Tangerine Tango
24 • Confetti Garden Twist
25 • Crazytunia Cherry Cheesecake
26 • Crazytunia Citrus Twist
27 • Crazytunia Fire Cracker
28 • Crazytunia KaBloom!
29 • Crazytunia Maniac Pink
30 • Crazytunia Sparky Improved
31 • Crazytunia Star Jubilee
32 • Crazytunia Swiss Danc
33 • Dekko Orange
34 • Famous Electric Orange
35 • Flamingo
36 • Fortunia Early Orange
37 • Glow Bright Red
38 • Glow Fire
39 • Glow Forest Fire
40 • Glow Pink Morn an
41 • GN2012-01 Type H
42 • Go!Tunia Orange
43 • GS HellOrange
44 • Happy Classic Orange Morn 0-65
45 • Happy Classic Yellow Orange Stripes
46 • Headliner Electric Orange
47 • Hells Bells Improved
48 • Hells Bells Orange
49 • Hells Fruit Punch
50 • Hells Glow
51 • Hoobini Pink
52 • KaBloom!
53 • KwikKombo Color My Sunset
54 • KwikKombo Orange Twist
55 • Lipstick
56 • Littletunia Red Fire
57 • Maui Sands
58 • Mini Rose Blast
59 • My Love
60 • My Love Orange
61 • OR4842
63 • OR4877
64 • OR4875
65 • Orange 15
66 • Orange Yellow Centre 749 07336
67 • Orange Yellow Zone 225
68 • Orange Star
69 • Pegasus Orange
70 • Pegasus Orange Morn
71 • Pegasus Orange Star
72 • Pega Orange
73 • P Pop
74 • Blast
75 • Mandarin
76 • P unia Orange
• P unia Orange Morn
• Pe unia Red Improved
• Pep Cerise
• Good and Plenty Orange 2016
82 • d and Plenty Pomegranate 2016
83 • Pe Salmon Ray
84 • Po Dark Red
85 • P Plus Neon
86 • unia Plus Papaya
87 • tunia Plus Red
88 • Potunia Plus Violet
89 • Potunia Red
90 • Potunia Deep Purple
91 • Rasperry Blast
2 • Salmon
• on Ray
• una Salmon
• tuna 2.0 GShell Orange Nr. 11-45
• tuna 2.0 Rose Coral 315
Orange
arlet Red
tars Yellow Orange
Surprise Red
Surprise Hot Rod Red
Surprise Orange Twist 2009
pertunia Flamingo
Supertunia Raspberry Blast
Supertunia Rose Blast Charm
Sweetunia Hot Pink
Sweetunia Hot Rod Red
Sweetunia Orange Flash
nia Purple Torch
Strawberry Ice
Trilogy '76 Mix—Liberty Mix
Trilogy Deep Purple
Trilogy Formula Mix
Trilogy Mango
Trilogy Red
Trixi Coco Bello
Viva Bright Red
Viva Fire
Viva Forest Fire
Viva Orange
Viva Orange Vein
Viva Pink Morn
Whispers Orange
APHIS
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FAREWELL TO THE ORANGE PETUNIAS

Curiously enough, the only thing that went through the mind of the bowl of petunias as it fell was Oh no, not again. Many people have speculated that if we knew exactly why the bowl of petunias had thought that we would know a lot more about the nature of the Universe than we do now.

Douglas Adams

The Hitchhiker's Guide to the Galaxy

When flowers become illegal

Klaus Pichler

The story of the orange petunias is more than just a scientific anecdote – it is rather a parable of what can happen when scientific interest, commercial marketing logic, socio-political values and unexpected coincidences collide.

The chronology of the case reads like a script: after a controversial scientific experiment, genetically modified petunias escape from the laboratory and slip into commercial breeding worldwide. Following a chance discovery, they get declared as ‚illegal' and are subsequently ordered to be destroyed en masse.

The destruction of the orange petunias in 2017 is only the peak of a series of twists and turns that goes back to the late 1980s, when one of the early experiments in genetic engineering took place at the Max Planck Institute for Plant Breeding Research in Cologne.[1] Back then, 30,000 transgenic petunias were planted in the garden of the institute, which were intended to bloom salmon-red instead of white due to genetic modification. The artificial flower color was supposed to serve the purpose of isolating so-called jumping genes (transposons) and to investigate their importance in evolution.[2]

The experiment was accompanied by protests from groups of activists and individuals who were avid critics of genetic engineering.[3] The experiment itself was soon regarded as a failure: during a heat wave in the summer of 1990, the salmon-red petunias had begun to turn increasingly pale, the experiment was viewed as unsuccessful and referred to in the media as the ‚biggest genetic research flop ever' and ‚fiasco in color'.[4]

Subsequently, however, the experiment had led to a significant gain in scientific knowledge in the field of epigenetics. This discipline with the aim of researching the effects of environmental influences on genes was only just becoming established at the time of the petunia experiment. The heat wave had activated epigenetic processes in the petunias that shut down the artificially introduced color genes and thus showed that environmental influences can directly affect gene activities.[5]

It is still unclear what happened after the experiment, when the transgenic petunias made an escape from the laboratory, slipped into commercial breeding and finally made it to the market. It is known that numerous huge international seed companies were involved in the experiment and continued their efforts afterwards. All of them stated that they did not seek breeding and commercialization.[6] It is possible that the transgenic background of the petunias has been forgotten in the course of the following company mergers – but if this general explanation is really true or there were purposeful intentions behind it: we shall never know.

What is certain, however, is that the transgenic background of the orange petunias had been overlooked until the chance discovery at Helsinki train station by the plant scientist Teemu Teeri in 2015. It was his find and his analysis that ultimately led to the worldwide recall of orange petunias in 2017.[7] The culmination point of the case is the document published by the US Department of Agriculture which gives guidelines for the safe destruction of transgenic petunias.[8] The following carnage of orange petunias on a global scale has been referred to as the ‚petunia crisis' among breeders.[9] It is estimated that the damage in the EU alone was around 30 million Euros, not to mention the enormous number of destroyed plants and the loss of confidence in the plant breeders' practices.

It is now clear that all commercial orange petunia varieties (up to now, 143 strains have been identified) are linked to the 1990 experiment in Cologne[10]: after an extensive analysis of genetic material from numerous commercial petunia varieties, a team of plant biochemists at the Vienna University of Technology found in 2020 that the tested flowers all had the same genetic sequence that was inserted in 1990.[11]

Retrospectively, the opponents' fears that genetically modified plants would end up in uncontrolled circulation have come true. But the case of the orange petunias can also be seen as the largest unintentional attempt at releasing transgenic plants worldwide – without any proof that they were dominant or dangerous in the more than 25 years to follow.[12]

It is rewarding to reflect upon the protagonists involved: the scientists, the plant breeders, the opponents of genetic engineering, the mainstream media and the ‚public' in general. In the chronology of the case, it is obvious that they all pursued their own interests, which were often only partially compatible with the interests of the other groups. The history of the orange petunia case therefore is an illustrative example of the tension between knowledge-based science and its commercial exploitation. The different intentions and convictions of the individual actors permeated the plant, which was turned from an ‚innocent' flower into an object of scientific, commercial and socio-political discourse through an inserted gene sequence. Therefore, the transgenic petunias became the central and ever-changing element of the whole story.

The history of the transgenic petunias illustrates the complex question of the approval of genetically modified plants. This is similar to other cases of transgenic plants that also have come into circulation without authorization. In the future, it will most likely become even more difficult to detect genetic modification, as advanced and precise gene-editing technologies like CRISPR will not leave any definitive evidence of changes in the genome of an organism.[13]

Recently, a new chapter in the story of the transgenic petunias was opened: after their massive destruction in 2017 and their disappearance from breeding and retail, there was a new turning point in January 2021. The US Department of Agriculture approved a petition from a German flower producer[14] for the licensing of transgenic petunias, stating that this petunia variety is unlikely to pose a plant pest risk to agricultural crops or other plants.[15] With this deregulation, the 15 A1-DFR varieties identified in the petition have been removed from the list of varieties that require import authorization. In other words: orange petunias will soon be celebrating the greatest comeback since Lazarus.

(1) P. Meyer, I. Heidmann et. al., ‘A new petunia flower colour generated by transformation of a mutant with a maize gene‘, Nature, vol. 330, pp. 677—678, 1987.

(2) P. Meyer, F. Linn et. al., ‘Endogenous and environmental factors influence 35S promoter methylation of a maize A1 gene construct in transgenic petunia and its colour phenotype, Molecular and General Genetics, vol. 231, 1992

(3) ‘Angriff auf Gen-Petunien‘ in: taz. die tageszeitung, June 27, 1990

(4) Protestaktion: ‘Fiasko in Farbe‘, in: DER SPIEGEL, Nr. 48, November, 1990

(5) M. M. Voorhuijzen, L. Grohmann et al., ‘Molecular characterization and event-specific real-time PCR detection of two dissimilar groups of genetically modified petunia (*petunia* x *hybrida*) sold on the market‘, Frontiers in Plant Science, July 14, 2020

(6) Kelly Servick, ‘How the transgenic petunia carnage of 2017 began‘, Science Magazine, May 24, 2017

(7) H. Bashandy, T. H. Teeri, ‘Genetically engineered orange petunias on the market‘, Planta No. 246, 2017

(8) ‘Guidance regarding the destruction of potential genetically engineered petunias‘, USDA — US Department of Agriculture, APHIS — Animal and Plant Inspection Service, October 18, 2017

(9) S. Oberschelp, ‘Petunienkrise — Gen over?‘, www.gabot.de, July 12, 2017

(10) C. Haselmair-Gosch, S. Miosic, H. Halbwirth et al., ‘Great cause—small effect: undeclared genetically engineered orange petunias harbor an inefficient dihydroflavonol 4-reductase‘, Frontiers in Plant Science, February 28, 2018

(11) C. Haselmair-Gosch, D. Nitarska, H. Halbwirth et al., ‘Event-specific qualitative polymerase chain reaction analysis for two T-DNA copies in genetically modified orange petunia‘, Plant Cell Tissue and Organ Culture No.142(2), August 2020

(12) G. Spelsberg, ‘Wie die Wissenschaftler den Kampf um die Deutungshoheit über die Kölner Petunien verloren‘, transgen.de, May 2015

(13) L. Grohmann, T. Sprink, ‘Detection and identification of genome editing in plants: challenges and opportunities‘, Frontiers in Plant Science, March 12, 2019

(14) ‘Petition for determination of nonregulated status of petunias genetically engineered for flower color‘, Westhoff Vertriebsgesellschaft mbH, aphis.usda.gov, July 25, 2019

(15) ‘USDA announces deregulation of petunias developed using genetic engineering‘, aphis.usda.gov, January 21, 2021

The title of the book ‚The Petunia Carnage‘ was adapted from the article ‚How the transgenic petunia carnage of 2017 began‘ by Kelly Servick, published in Science Magazine, May 24, 2017. The adaption was kindly permitted by Kelly Servick. https://www.sciencemag.org/news/2017/05/how-transgenic-petunia-carnage-2017-began

Dead plants in green house, image taken with kind permission of the Eichinger family at the facilities of Blumengärtnerei Eichinger, Vienna. www.blumengaertnerei-eichinger.at

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High-performance liquid chromatography (HLPC) machine, image taken at the research facilities at the Technical University Vienna, www.tuwien.at, Research Group for Phytochemistry and Plant Biochemistry

Transgenic petunias at the Helsinki Railway Station: The image was kindly provided Teemu Teeri, University of Helsinki, Finland, www.helsinki.fi/vips

Plant biologist Teemu Teeri talking about his first petunia encounter. This quote was taken from the article ‘How the transgenic petunia carnage of 2017 began‘ by Kelly Servick, published in Science Magazine, May 24, 2017. The citation was kindly permitted by Kelly Servick.
https://www.sciencemag.org/news/2017/05/how-transgenic-petunia-carnage-2017-began

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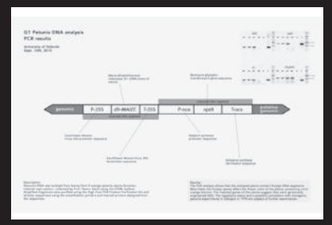
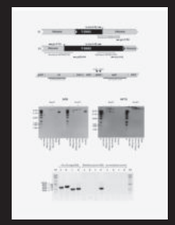
PCR Results: Data adapted from C. Haselmair-Gosch, S. Misoic et. al., ‘Great cause - small effect: undeclared genetically engineered orange petunias harbor an inefficient dihydroflavonol 4-reductase‘, Frontiers in Plant science, February 28, 2018 and M. M. Voorhuijzen et al., ‚Molecular characterization and event-specific real-time PCR detection of two dissimilar groups of genetically modified petunia sold on the market‘, Frontiers in Plant Science, July 14, 2020





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Plant biologist Teemu Teeri talking about the unfolding of the petunia mass destruction. This text passage is based on an adaption of the article ‘How the transgenic petunia carnage of 2017 began‘ by Kelly Servick, published in Science Magazine, May 24, 2017. The adaption was kindly permitted by Kelly Servick.
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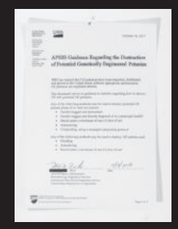
‘A new petunia variety made by gene transfer‘, image kindly provided by the Archive of the Max Planck Society, Berlin-Dahlem, Germany, www.archiv-berlin.mpg.de



‘Guidance regarding the destruction of potential genetically engineered petunias‘, press release by USDA — US Department of Agriculture, APHIS — Animal and Plant Inspection Service, October 18, 2017
www.aphis.usda.gov/biotechnology/downloads/petunia_disposition_guidance.pdf

‘Angriff auf Gen-Petunien‘ printed in: taz. die tageszeitung, June 27, 1990, www.taz.de

‘Fiasko in Farbe‘, printed in: DER SPIEGEL, Nr. 48, Nov. 1990, www.spiegel.de

‘List of potential genetically engineered petunias‘, press release by USDA — US Department of Agriculture, APHIS — Animal and Plant Inspection Service, Nov. 2017
www.aphis.usda.gov/biotechnology/downloads/petunia_varieties.pdf

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