



**SPACESTATION
LIVE**

1
00:00:09,030 --> 00:00:06,710
we all remember the great photos of crew

2
00:00:11,350 --> 00:00:09,040
members chell lindgren and scott kelly

3
00:00:13,350 --> 00:00:11,360
as they ate lettuce on the station and

4
00:00:15,669 --> 00:00:13,360
then scott kelly showed off his green

5
00:00:17,990 --> 00:00:15,679
thumb by showing us beautiful pictures

6
00:00:19,750 --> 00:00:18,000
of the zinnias he had grown in space

7
00:00:22,790 --> 00:00:19,760
well all that is thanks to a facility

8
00:00:25,429 --> 00:00:22,800
called veggie i spoke with joya masa the

9
00:00:27,349 --> 00:00:25,439
veggie scientist at kennedy space center

10
00:00:29,109 --> 00:00:27,359
to get the latest on the lettuce and

11
00:00:31,349 --> 00:00:29,119
find out what astronauts will be growing

12
00:00:32,870 --> 00:00:31,359
next yeah i don't think any of us

13
00:00:34,150 --> 00:00:32,880

expected that

14

00:00:36,630 --> 00:00:34,160

you know we

15

00:00:39,030 --> 00:00:36,640

we think it's exciting but we really had

16

00:00:42,150 --> 00:00:39,040

no idea how the general public would

17

00:00:44,150 --> 00:00:42,160

respond and i mean we've had media

18

00:00:45,670 --> 00:00:44,160

inquiries from all over the world you

19

00:00:47,830 --> 00:00:45,680

know

20

00:00:50,549 --> 00:00:47,840

many many students have been really

21

00:00:52,869 --> 00:00:50,559

engaged by it which has been wonderful

22

00:00:55,110 --> 00:00:52,879

and just yeah the general public i think

23

00:00:57,430 --> 00:00:55,120

it came down to the people that like

24

00:01:00,069 --> 00:00:57,440

growing plants the people that like

25

00:01:02,229 --> 00:01:00,079

to cook and the people that like to eat

26
00:01:03,910 --> 00:01:02,239
and that's a lot of people so pretty

27
00:01:06,710 --> 00:01:03,920
much everybody yeah

28
00:01:08,230 --> 00:01:06,720
it was a huge success we learned a lot

29
00:01:09,990 --> 00:01:08,240
and and we were just delighted that the

30
00:01:11,350 --> 00:01:10,000
astronauts were able to eat the lettuce

31
00:01:13,109 --> 00:01:11,360
finally

32
00:01:15,109 --> 00:01:13,119
did it taste like lettuce

33
00:01:18,230 --> 00:01:15,119
well um from what we heard it tasted

34
00:01:21,270 --> 00:01:18,240
fresh it tasted a little like arugula

35
00:01:23,190 --> 00:01:21,280
some of the the plants in this group get

36
00:01:24,789 --> 00:01:23,200
some more bitter compounds if they're

37
00:01:26,950 --> 00:01:24,799
under some stress and they were under

38
00:01:28,710 --> 00:01:26,960

some water stress and arugula tends to

39

00:01:31,030 --> 00:01:28,720

be a little more bitter than lettuce so

40

00:01:32,870 --> 00:01:31,040

when we heard scott kelly said kind of

41

00:01:34,710 --> 00:01:32,880

like arugula we thought

42

00:01:36,390 --> 00:01:34,720

you know that that's really interesting

43

00:01:38,310 --> 00:01:36,400

maybe it did get some of those more

44

00:01:40,310 --> 00:01:38,320

bitter compounds but i think in space

45

00:01:42,389 --> 00:01:40,320

having that enhanced flavor is actually

46

00:01:44,310 --> 00:01:42,399

really desirable so they seemed to

47

00:01:47,190 --> 00:01:44,320

really enjoy it there wasn't a lot they

48

00:01:49,910 --> 00:01:47,200

didn't get to eat a ton

49

00:01:52,789 --> 00:01:49,920

no and we are still bringing back some

50

00:01:54,550 --> 00:01:52,799

frozen for for scientific analysis to to

51
00:01:56,550 --> 00:01:54,560
just confirm so we didn't let them eat

52
00:01:58,310 --> 00:01:56,560
all of it but you wanted to like too

53
00:02:01,030 --> 00:01:58,320
right yeah

54
00:02:02,310 --> 00:02:01,040
but probably not frozen

55
00:02:03,749 --> 00:02:02,320
hi

56
00:02:05,270 --> 00:02:03,759
scott kelly aboard the international

57
00:02:08,070 --> 00:02:05,280
space station

58
00:02:11,270 --> 00:02:08,080
i want to go and check on my

59
00:02:13,030 --> 00:02:11,280
flowers i'm growing here in the

60
00:02:15,910 --> 00:02:13,040
columbus module

61
00:02:18,390 --> 00:02:15,920
so after the lettuce

62
00:02:20,150 --> 00:02:18,400
they were able to grow the zinnia seeds

63
00:02:22,070 --> 00:02:20,160

that we had on orbit and so we'd sent

64

00:02:23,990 --> 00:02:22,080

zinnias we weren't sure when they would

65

00:02:25,910 --> 00:02:24,000

be able to eat the lettuce so so we

66

00:02:27,430 --> 00:02:25,920

wanted to send a crop that they wouldn't

67

00:02:29,910 --> 00:02:27,440

want to eat but that they could enjoy

68

00:02:32,150 --> 00:02:29,920

and have have bloom and zinnia is a

69

00:02:35,589 --> 00:02:32,160

great model system for

70

00:02:37,190 --> 00:02:35,599

longer duration crops like tomato and so

71

00:02:39,030 --> 00:02:37,200

this is a really great test for the

72

00:02:41,750 --> 00:02:39,040

system to see how it runs under a longer

73

00:02:43,990 --> 00:02:41,760

duration and also zinnia is a flowering

74

00:02:46,229 --> 00:02:44,000

crop and so tomatoes will have to flower

75

00:02:48,390 --> 00:02:46,239

before they set fruit so seeing how

76

00:02:50,070 --> 00:02:48,400

crops flower in the system

77

00:02:52,229 --> 00:02:50,080

seeing if there are any limitations on

78

00:02:53,830 --> 00:02:52,239

that is really important

79

00:02:56,869 --> 00:02:53,840

it's kind of nice to have some flowers

80

00:02:59,990 --> 00:02:56,879

up here you don't see much that is

81

00:03:01,030 --> 00:03:00,000

alive and growing besides the six of us

82

00:03:02,949 --> 00:03:01,040

here

83

00:03:04,470 --> 00:03:02,959

it's had a psychological effect too and

84

00:03:07,030 --> 00:03:04,480

i think that's what your hopes were as

85

00:03:08,869 --> 00:03:07,040

well right yeah i mean we're very

86

00:03:10,710 --> 00:03:08,879

interested to see this and we also have

87

00:03:13,589 --> 00:03:10,720

future you know experiments where we'll

88

00:03:15,830 --> 00:03:13,599

actually be evaluating some of that um

89

00:03:17,670 --> 00:03:15,840

but just seeing the the the crew

90

00:03:19,350 --> 00:03:17,680

enjoyment seeing them take the flowers

91

00:03:21,750 --> 00:03:19,360

out move them to different parts of the

92

00:03:23,990 --> 00:03:21,760

habitat they they posed with one of the

93

00:03:25,350 --> 00:03:24,000

the first flowers for the 300 day photo

94

00:03:27,750 --> 00:03:25,360

and then they put it on their dining

95

00:03:30,789 --> 00:03:27,760

table for dinner that night you know so

96

00:03:32,710 --> 00:03:30,799

i think it really um shows the impact of

97

00:03:34,550 --> 00:03:32,720

having something green and growing when

98

00:03:36,550 --> 00:03:34,560

you're living in this environment so far

99

00:03:38,550 --> 00:03:36,560

away from from earth and from green

100

00:03:40,229 --> 00:03:38,560

growing things generally

101
00:03:43,589 --> 00:03:40,239
so what's next what are we going to see

102
00:03:45,910 --> 00:03:43,599
next growing so next we're sending some

103
00:03:47,350 --> 00:03:45,920
chinese cabbage and some more of the red

104
00:03:49,110 --> 00:03:47,360
romaine lettuce

105
00:03:51,190 --> 00:03:49,120
the chinese cabbage was actually

106
00:03:54,070 --> 00:03:51,200
selected through a human research

107
00:03:57,190 --> 00:03:54,080
program funded study where we down

108
00:03:59,429 --> 00:03:57,200
selected crops based on

109
00:04:01,270 --> 00:03:59,439
how well they grow their nutritional

110
00:04:03,270 --> 00:04:01,280
attributes looking specifically at

111
00:04:07,270 --> 00:04:03,280
nutrients that are really desired for

112
00:04:09,110 --> 00:04:07,280
the space diet and their organoleptic

113
00:04:11,670 --> 00:04:09,120

attributes how how the flavor is how

114

00:04:13,429 --> 00:04:11,680

well they taste we actually grew produce

115

00:04:14,949 --> 00:04:13,439

of a bunch of different varieties sent

116

00:04:16,629 --> 00:04:14,959

them to johnson space center from

117

00:04:19,349 --> 00:04:16,639

kennedy where they did the the taste

118

00:04:20,469 --> 00:04:19,359

evaluations at johnson and this chinese

119

00:04:22,469 --> 00:04:20,479

cabbage

120

00:04:24,550 --> 00:04:22,479

wasn't the most nutritious but it was by

121

00:04:27,030 --> 00:04:24,560

far the best horticulturally it was very

122

00:04:29,430 --> 00:04:27,040

productive fast-growing plant and it got

123

00:04:31,189 --> 00:04:29,440

off the charts um organoleptic

124

00:04:33,189 --> 00:04:31,199

evaluations people just love the taste

125

00:04:35,110 --> 00:04:33,199

of it so we think that the astronauts

126
00:04:36,390 --> 00:04:35,120
are going to love this as well

127
00:04:39,670 --> 00:04:36,400
we are going to send more of the red

128
00:04:42,790 --> 00:04:39,680
romaine lettuce also and those two crops

129
00:04:44,550 --> 00:04:42,800
will be sent up on spacex eight um we're

130
00:04:46,310 --> 00:04:44,560
also going to try sending some ranch

131
00:04:47,749 --> 00:04:46,320
dressing in the future to go along with

132
00:04:49,590 --> 00:04:47,759
our salad okay

133
00:04:51,189 --> 00:04:49,600
yeah so they're gonna need some tomatoes

134
00:04:52,150 --> 00:04:51,199
for that salad though when are we gonna

135
00:04:54,070 --> 00:04:52,160
see that

136
00:04:56,310 --> 00:04:54,080
so over the next couple of years we're

137
00:04:59,189 --> 00:04:56,320
working on growing tomatoes in this

138
00:05:01,029 --> 00:04:59,199

system we've down selected also a small

139

00:05:04,390 --> 00:05:01,039

variety of tomatoes it's about this tall

140

00:05:07,110 --> 00:05:04,400

it's called red robin and it's a cherry

141

00:05:08,950 --> 00:05:07,120

tomato and so we will have

142

00:05:11,029 --> 00:05:08,960

our next couple of veggie flights we're

143

00:05:12,950 --> 00:05:11,039

going to actually be doing experiments

144

00:05:14,629 --> 00:05:12,960

and this is something that i'm leading a

145

00:05:17,830 --> 00:05:14,639

team from

146

00:05:19,749 --> 00:05:17,840

kennedy johnson purdue university and

147

00:05:21,430 --> 00:05:19,759

orbitech orbital technologies

148

00:05:24,469 --> 00:05:21,440

corporation that developed the veggie

149

00:05:25,909 --> 00:05:24,479

and we're doing light recipes for these

150

00:05:28,950 --> 00:05:25,919

crops so we're going to see what is the

151
00:05:31,029 --> 00:05:28,960
best red to blue ratio to give the best

152
00:05:32,870 --> 00:05:31,039
nutrition and flavor and growth of the

153
00:05:34,710 --> 00:05:32,880
crops and we're also going to do some

154
00:05:37,029 --> 00:05:34,720
fertilizer testing so we'll do this with

155
00:05:38,790 --> 00:05:37,039
chinese cabbage again and then we're

156
00:05:40,550 --> 00:05:38,800
going to do this with dwarf tomato and

157
00:05:42,870 --> 00:05:40,560
the chinese cabbage will be probably

158
00:05:45,749 --> 00:05:42,880
around the end of 2017

159
00:05:46,950 --> 00:05:45,759
and the dwarf tomato will be around 2018

160
00:05:48,310 --> 00:05:46,960
time frame

161
00:05:50,310 --> 00:05:48,320
we're going to actually have two veggie

162
00:05:52,390 --> 00:05:50,320
units up there by that point to be able

163
00:05:53,670 --> 00:05:52,400

to do some side-by-side testing what do

164

00:05:55,270 --> 00:05:53,680

you think when you saw the martian and

165

00:05:56,790 --> 00:05:55,280

he was growing his own food oh i thought

166

00:05:59,110 --> 00:05:56,800

that was wonderful i think it really

167

00:06:01,110 --> 00:05:59,120

raised awareness among you know the

168

00:06:04,070 --> 00:06:01,120

general public and nasa as a whole about

169

00:06:05,670 --> 00:06:04,080

the importance of food production and

170

00:06:07,749 --> 00:06:05,680

you know getting us to the point where

171

00:06:09,909 --> 00:06:07,759

we will be able to grow a larger

172

00:06:12,390 --> 00:06:09,919

percentage of our diet um

173

00:06:14,550 --> 00:06:12,400

and also just the the importance of of

174

00:06:16,710 --> 00:06:14,560

having plants you know in in a scenario

175

00:06:19,270 --> 00:06:16,720

when you're on this really desolate you

