



1  
00:00:04,870 --> 00:00:03,429  
i am touched

2  
00:00:06,470 --> 00:00:04,880  
are you doing a kitchen are you going to

3  
00:00:07,510 --> 00:00:06,480  
do a free video kitchen

4  
00:00:09,110 --> 00:00:07,520  
you're looking forward to it you want

5  
00:00:11,669 --> 00:00:09,120  
those new cabinets in there but what's

6  
00:00:13,270 --> 00:00:11,679  
the best part best parts demolition

7  
00:00:14,950 --> 00:00:13,280  
that's the best part and that's what i

8  
00:00:16,390 --> 00:00:14,960  
get to do today i'm not going to sit

9  
00:00:17,510 --> 00:00:16,400  
there and talk about the electromagnetic

10  
00:00:19,750 --> 00:00:17,520  
theory of olfaction that i've done

11  
00:00:21,750 --> 00:00:19,760  
before in years past instead i am going

12  
00:00:23,590 --> 00:00:21,760  
to tear apart the current theory as it

13  
00:00:25,750 --> 00:00:23,600

stands right now and i'm going to do so

14

00:00:27,910 --> 00:00:25,760

with the temporal evidence disproving

15

00:00:30,790 --> 00:00:27,920

the current theory of insectal faction

16

00:00:32,549 --> 00:00:30,800

temporal evidence evidence let's begin

17

00:00:33,670 --> 00:00:32,559

what do we have here here we have our

18

00:00:36,630 --> 00:00:33,680

resident insect up there that's a

19

00:00:38,150 --> 00:00:36,640

penitent stink bug it's got an antenna i

20

00:00:39,590 --> 00:00:38,160

think everybody knows or the science

21

00:00:41,110 --> 00:00:39,600

background knows that insect smell

22

00:00:42,630 --> 00:00:41,120

through their antenna if you get a

23

00:00:43,910 --> 00:00:42,640

close-up of the antenna you can see that

24

00:00:46,150 --> 00:00:43,920

there are these structures coming out

25

00:00:48,150 --> 00:00:46,160

those structures we know are involved in

26

00:00:50,069 --> 00:00:48,160

odorant detection and if you take a

27

00:00:51,590 --> 00:00:50,079

closer look at those structures you also

28

00:00:53,750 --> 00:00:51,600

see that they are hollow

29

00:00:55,430 --> 00:00:53,760

the pheromones these long chain fatty

30

00:00:57,029 --> 00:00:55,440

acids maybe have some difficulty saying

31

00:00:58,869 --> 00:00:57,039

that especially for some of my older

32

00:01:00,790 --> 00:00:58,879

friends it's another joke for you john

33

00:01:01,990 --> 00:01:00,800

alexander i'm going to zoom in on this

34

00:01:03,510 --> 00:01:02,000

right now so you can take a close look

35

00:01:05,750 --> 00:01:03,520

at the scencilla you can see that it is

36

00:01:07,910 --> 00:01:05,760

hollow the pheromones long chain fatty

37

00:01:10,149 --> 00:01:07,920

acids they come through these tiny pores

38

00:01:12,950 --> 00:01:10,159

10 to 15 nanometers they make a way

39

00:01:15,510 --> 00:01:12,960

through to the dendrites and boom

40

00:01:18,070 --> 00:01:15,520

boom that's when detection occurs at

41

00:01:19,510 --> 00:01:18,080

least that's what we're told

42

00:01:20,710 --> 00:01:19,520

so this is what they have to get through

43

00:01:22,950 --> 00:01:20,720

it's not just a matter of getting

44

00:01:25,190 --> 00:01:22,960

through these tiny pores it's a matter

45

00:01:28,070 --> 00:01:25,200

of getting through this uh very complex

46

00:01:29,510 --> 00:01:28,080

milieu so the pheromone hits the outside

47

00:01:31,670 --> 00:01:29,520

first thing it does it gets picked off

48

00:01:33,429 --> 00:01:31,680

by pheromone degrading enzymes for those

49

00:01:34,870 --> 00:01:33,439

that make it through the pores they have

50

00:01:36,310 --> 00:01:34,880

to get through the waxy layer then to

51  
00:01:38,469 --> 00:01:36,320  
the pores then they're going to be

52  
00:01:39,590 --> 00:01:38,479  
picked up by a pheromone binding protein

53  
00:01:42,230 --> 00:01:39,600  
the reason why

54  
00:01:44,469 --> 00:01:42,240  
it's a fatty acid and this is mostly

55  
00:01:45,990 --> 00:01:44,479  
water up here so because this is mostly

56  
00:01:48,069 --> 00:01:46,000  
water the fatty acids are just going to

57  
00:01:49,670 --> 00:01:48,079  
get stuck at these pores so they got to

58  
00:01:52,710 --> 00:01:49,680  
be picked off by the pheromone binding

59  
00:01:55,030 --> 00:01:52,720  
protein and then they can diffuse

60  
00:01:57,990 --> 00:01:55,040  
to get to the dendrite right here and

61  
00:02:00,550 --> 00:01:58,000  
the eventual receptors this is very very

62  
00:02:02,230 --> 00:02:00,560  
thick stuff just last month i went to a

63  
00:02:04,550 --> 00:02:02,240

conference in sarasota someone told me

64

00:02:06,389 --> 00:02:04,560

this is like a gel

65

00:02:07,830 --> 00:02:06,399

that's how thick this stuff is just to

66

00:02:09,430 --> 00:02:07,840

give you an idea of what we're getting

67

00:02:11,670 --> 00:02:09,440

into right now because we're going to

68

00:02:13,270 --> 00:02:11,680

get into some complex uh

69

00:02:16,070 --> 00:02:13,280

equations here

70

00:02:17,830 --> 00:02:16,080

namely simple arithmetic

71

00:02:19,190 --> 00:02:17,840

but i wanted to start out with the early

72

00:02:20,630 --> 00:02:19,200

conclusions right now because i just

73

00:02:22,390 --> 00:02:20,640

told you that this is what the current

74

00:02:23,270 --> 00:02:22,400

theory says this is what the pheromone

75

00:02:26,150 --> 00:02:23,280

does

76  
00:02:28,150 --> 00:02:26,160  
but right now as of 2009 as i'm standing

77  
00:02:31,270 --> 00:02:28,160  
up here right now i can tell you that

78  
00:02:33,509 --> 00:02:31,280  
binding has not been shown

79  
00:02:35,670 --> 00:02:33,519  
classic pharmacology aside

80  
00:02:38,229 --> 00:02:35,680  
binding has not been shown so there's

81  
00:02:40,070 --> 00:02:38,239  
either two conclusions either one

82  
00:02:42,550 --> 00:02:40,080  
binding occurs

83  
00:02:44,710 --> 00:02:42,560  
or binding doesn't occur it doesn't get

84  
00:02:46,790 --> 00:02:44,720  
any simpler than that

85  
00:02:48,710 --> 00:02:46,800  
if binding does occur the technology

86  
00:02:50,630 --> 00:02:48,720  
just hasn't found a way to show it yet

87  
00:02:52,309 --> 00:02:50,640  
and if you talk to an entomologist

88  
00:02:54,070 --> 00:02:52,319

another entomologist not this

89

00:02:55,910 --> 00:02:54,080

entomologist they will tell you that

90

00:02:57,830 --> 00:02:55,920

technology has not found it yet but

91

00:02:59,910 --> 00:02:57,840

binding will be shown just give us the

92

00:03:01,750 --> 00:02:59,920

right equipment we'll show it to you

93

00:03:03,430 --> 00:03:01,760

if binding does not occur detection of

94

00:03:05,430 --> 00:03:03,440

the pheromone must occur through some

95

00:03:07,350 --> 00:03:05,440

alternate means you know where i'm going

96

00:03:09,270 --> 00:03:07,360

to go if i go in that direction and i'm

97

00:03:11,750 --> 00:03:09,280

not going in that direction i'm going to

98

00:03:13,030 --> 00:03:11,760

assume right now that binding does occur

99

00:03:15,270 --> 00:03:13,040

and i'm going to see whether or not we

100

00:03:16,710 --> 00:03:15,280

can get that pheromone inside using

101  
00:03:19,110 --> 00:03:16,720  
logic

102  
00:03:20,550 --> 00:03:19,120  
reason and review the scientific

103  
00:03:22,309 --> 00:03:20,560  
literature

104  
00:03:23,350 --> 00:03:22,319  
here we go we've got seven steps to deal

105  
00:03:26,309 --> 00:03:23,360  
with

106  
00:03:28,470 --> 00:03:26,319  
time to adhere to the syncilla one time

107  
00:03:30,949 --> 00:03:28,480  
to diffuse through the wax layer once it

108  
00:03:33,030 --> 00:03:30,959  
lands on the scincilla three time to

109  
00:03:34,710 --> 00:03:33,040  
diffuse through those tiny pores that i

110  
00:03:36,949 --> 00:03:34,720  
discussed four

111  
00:03:38,710 --> 00:03:36,959  
time to actually bind the pheromone that

112  
00:03:40,229 --> 00:03:38,720  
pheromone binding protein which fairy

113  
00:03:42,949 --> 00:03:40,239

boats it across

114

00:03:46,229 --> 00:03:42,959

five time to transport this same

115

00:03:47,910 --> 00:03:46,239

pheromone after it's been bound six time

116

00:03:49,589 --> 00:03:47,920

to dissociate

117

00:03:51,750 --> 00:03:49,599

from the pheromone that firearm binding

118

00:03:53,750 --> 00:03:51,760

protein in the pheromone and finally the

119

00:03:56,630 --> 00:03:53,760

time to activate the receptor what's my

120

00:03:58,470 --> 00:03:56,640

goal my goal is one to ten milliseconds

121

00:04:00,309 --> 00:03:58,480

why is it one to ten milliseconds did i

122

00:04:01,910 --> 00:04:00,319

just make this up am i trying to pull

123

00:04:04,550 --> 00:04:01,920

the wool over your eyes right now no i'm

124

00:04:07,270 --> 00:04:04,560

not go back to 1962. you can see we got

125

00:04:10,149 --> 00:04:07,280

a paper that says that from the time

126

00:04:12,630 --> 00:04:10,159

that a molecule an odorant a smelling

127

00:04:14,869 --> 00:04:12,640

molecule reaches the receptor the

128

00:04:16,550 --> 00:04:14,879

outside of the receptor the response on

129

00:04:19,349 --> 00:04:16,560

the inside is going to take about three

130

00:04:20,789 --> 00:04:19,359

milliseconds that was back in 1962. of

131

00:04:22,790 --> 00:04:20,799

course we have better equipment nowadays

132

00:04:23,749 --> 00:04:22,800

don't we there was another individual

133

00:04:25,830 --> 00:04:23,759

and it was actually during a

134

00:04:27,830 --> 00:04:25,840

presentation and i don't think it's been

135

00:04:29,670 --> 00:04:27,840

published yet but he went ahead and said

136

00:04:30,790 --> 00:04:29,680

that once it's been sensitized i think

137

00:04:32,629 --> 00:04:30,800

it could be done in less than one

138

00:04:34,390 --> 00:04:32,639

millisecond of course this raised some

139

00:04:37,189 --> 00:04:34,400

eyebrows

140

00:04:39,270 --> 00:04:37,199

wendell roloffs uh uh from my alma mater

141

00:04:41,189 --> 00:04:39,280

at cornell told me when i asked him i

142

00:04:42,950 --> 00:04:41,199

said how long does it take and he says

143

00:04:44,150 --> 00:04:42,960

well i'm not really sure and i said you

144

00:04:45,350 --> 00:04:44,160

know i'm trying to pinpoint him i said

145

00:04:47,430 --> 00:04:45,360

give me something i said is it 10

146

00:04:49,270 --> 00:04:47,440

milliseconds oh no no it's definitely

147

00:04:50,629 --> 00:04:49,280

less than 10 milliseconds i thought all

148

00:04:51,830 --> 00:04:50,639

right definitely less than 10

149

00:04:53,510 --> 00:04:51,840

milliseconds

150

00:04:57,350 --> 00:04:53,520

carl casling published in chemical

151  
00:04:59,590 --> 00:04:57,360  
census 2001 said it is 10 milliseconds

152  
00:05:01,189 --> 00:04:59,600  
i chatted with him recently in 2008 and

153  
00:05:02,710 --> 00:05:01,199  
said are we still sticking with this are

154  
00:05:04,070 --> 00:05:02,720  
we still at 10 milliseconds he says

155  
00:05:05,990 --> 00:05:04,080  
absolutely we're still at 10

156  
00:05:07,590 --> 00:05:06,000  
milliseconds i said fantastic now i've

157  
00:05:09,830 --> 00:05:07,600  
got something to work with

158  
00:05:11,590 --> 00:05:09,840  
so my goal is to get that to it in one

159  
00:05:13,430 --> 00:05:11,600  
to ten milliseconds if i have seven

160  
00:05:15,350 --> 00:05:13,440  
seven steps

161  
00:05:17,189 --> 00:05:15,360  
and i've got one millisecond to do it

162  
00:05:19,350 --> 00:05:17,199  
each step is going to be 0.1 to 0.2

163  
00:05:21,430 --> 00:05:19,360

milliseconds if it's 10 milliseconds

164

00:05:23,029 --> 00:05:21,440

each step is going to be do the math a

165

00:05:25,029 --> 00:05:23,039

little over one millisecond are you

166

00:05:26,629 --> 00:05:25,039

following me here simple arithmetic

167

00:05:28,790 --> 00:05:26,639

that's all i'm doing here

168

00:05:30,550 --> 00:05:28,800

time to adhere to the syncilla i'm gonna

169

00:05:32,230 --> 00:05:30,560

call that time zero

170

00:05:33,749 --> 00:05:32,240

so the time that it takes is zero

171

00:05:36,469 --> 00:05:33,759

milliseconds

172

00:05:38,390 --> 00:05:36,479

so far so good second step time to

173

00:05:40,150 --> 00:05:38,400

diffuse through the wax this is a little

174

00:05:41,430 --> 00:05:40,160

more complicated some of you may know

175

00:05:43,029 --> 00:05:41,440

that i'm a competitive swimmer i've been

176  
00:05:45,270 --> 00:05:43,039  
around divers all my life so this is the

177  
00:05:46,390 --> 00:05:45,280  
example i'm going to use you may choose

178  
00:05:48,230 --> 00:05:46,400  
something different

179  
00:05:50,950 --> 00:05:48,240  
the diver goes off the platform 10

180  
00:05:52,870 --> 00:05:50,960  
meters high hits the water what happens

181  
00:05:54,710 --> 00:05:52,880  
he slows down

182  
00:05:56,950 --> 00:05:54,720  
good thing too because if he hit the

183  
00:05:58,550 --> 00:05:56,960  
bottom at the speed that he is going at

184  
00:06:00,950 --> 00:05:58,560  
about 40 miles per hour it's going to be

185  
00:06:03,990 --> 00:06:00,960  
really painful possibly even fatal he's

186  
00:06:06,469 --> 00:06:04,000  
only got four meters to slow down why

187  
00:06:10,309 --> 00:06:06,479  
because the air is not as viscous as the

188  
00:06:11,990 --> 00:06:10,319

water so viscosity is a factor

189

00:06:13,749 --> 00:06:12,000

viscosity is also dependent upon the

190

00:06:16,390 --> 00:06:13,759

temperature well what do i mean by that

191

00:06:18,150 --> 00:06:16,400

well i think everyone knows who has a

192

00:06:19,909 --> 00:06:18,160

physics background knows that viscosity

193

00:06:22,150 --> 00:06:19,919

is dependent upon temperature let's just

194

00:06:23,909 --> 00:06:22,160

use two for example most competitive

195

00:06:25,110 --> 00:06:23,919

pools are about 80 degrees

196

00:06:27,350 --> 00:06:25,120

that's what we're swimming in that's

197

00:06:28,790 --> 00:06:27,360

what the divers are jumping into however

198

00:06:31,510 --> 00:06:28,800

if the temperature of the water were 20

199

00:06:34,070 --> 00:06:31,520

degrees how would the viscosity change

200

00:06:36,070 --> 00:06:34,080

well we've now had a state of matter

201  
00:06:37,590 --> 00:06:36,080  
change uh we're now no longer a liquid

202  
00:06:39,350 --> 00:06:37,600  
we're in a solid the diver would jump

203  
00:06:40,950 --> 00:06:39,360  
into this there'd be a problem as you

204  
00:06:42,629 --> 00:06:40,960  
can see right now that it's not

205  
00:06:44,629 --> 00:06:42,639  
necessarily a viscosity problem isn't

206  
00:06:46,870 --> 00:06:44,639  
that it's a state of matter problem that

207  
00:06:48,150 --> 00:06:46,880  
we have right now so based upon this

208  
00:06:50,390 --> 00:06:48,160  
logic and i hope you're following me

209  
00:06:52,309 --> 00:06:50,400  
right now and i'm not talking too fast

210  
00:06:53,590 --> 00:06:52,319  
if you take a look at the waxy layer

211  
00:06:55,189 --> 00:06:53,600  
because this is important to look at

212  
00:06:57,189 --> 00:06:55,199  
take a look at god bless you take a look

213  
00:06:58,469 --> 00:06:57,199

at the waxy layer the waxy layer is not

214

00:06:59,990 --> 00:06:58,479

something that most people want to look

215

00:07:01,990 --> 00:07:00,000

at but i did find a few papers that

216

00:07:04,150 --> 00:07:02,000

looked at it and yes they went ahead and

217

00:07:05,350 --> 00:07:04,160

found on this desert beetle a tiny

218

00:07:08,550 --> 00:07:05,360

brionite

219

00:07:10,309 --> 00:07:08,560

a lot of waxes on the waxy layer for

220

00:07:12,230 --> 00:07:10,319

those of you who may not be autistic who

221

00:07:14,150 --> 00:07:12,240

haven't memorized all this right now

222

00:07:17,270 --> 00:07:14,160

i'll let you know right now and cut to

223

00:07:18,629 --> 00:07:17,280

the chase there's 118 waxes there 118 is

224

00:07:20,309 --> 00:07:18,639

a lot to look at in a 20 minute

225

00:07:21,270 --> 00:07:20,319

presentation it's not going to happen so

226

00:07:23,749 --> 00:07:21,280

what i'm going to do is i'm going to

227

00:07:26,469 --> 00:07:23,759

look at some of the waxes rather than

228

00:07:27,990 --> 00:07:26,479

all of the waxes let's focus in on just

229

00:07:30,710 --> 00:07:28,000

eight of them the eight that i'm

230

00:07:33,909 --> 00:07:30,720

focusing in on are the n alkanes these

231

00:07:35,430 --> 00:07:33,919

are the branched uh unbranched ones

232

00:07:36,870 --> 00:07:35,440

so there are lots of branched ones we

233

00:07:39,510 --> 00:07:36,880

saw a lot of those 110 of them but

234

00:07:41,189 --> 00:07:39,520

there's only eight that are n alkanes

235

00:07:42,790 --> 00:07:41,199

why am i looking at the n alkanes is

236

00:07:44,550 --> 00:07:42,800

this an arbitrary thing that i'm making

237

00:07:46,950 --> 00:07:44,560

up right now

238

00:07:48,710 --> 00:07:46,960

no i'm focusing on these n alkanes for a

239

00:07:50,790 --> 00:07:48,720

very specific reason the reason why i

240

00:07:53,189 --> 00:07:50,800

want to focus on these more than the

241

00:07:57,029 --> 00:07:53,199

others is because this is generally what

242

00:07:59,029 --> 00:07:57,039

most insect waxes are composed of

243

00:08:00,950 --> 00:07:59,039

so you will find the n alkanes in a

244

00:08:03,510 --> 00:08:00,960

higher amount than you will find the

245

00:08:05,510 --> 00:08:03,520

branched waxes and so if we take a look

246

00:08:07,990 --> 00:08:05,520

at them we could see their percentages

247

00:08:10,790 --> 00:08:08,000

of these particular n alkanes and this

248

00:08:12,710 --> 00:08:10,800

particular desert tenebrianide and these

249

00:08:17,189 --> 00:08:12,720

are the breakdown of them right now

250

00:08:20,230 --> 00:08:17,199

total over one-third of the waxes

251  
00:08:23,110 --> 00:08:20,240  
are contained in these eight waxes which

252  
00:08:25,029 --> 00:08:23,120  
means two-thirds of the insect waxes are

253  
00:08:27,350 --> 00:08:25,039  
in the remainder so therefore it would

254  
00:08:29,350 --> 00:08:27,360  
behoove me to take a look at these waxes

255  
00:08:33,430 --> 00:08:29,360  
in particular because they do seem to be

256  
00:08:34,790 --> 00:08:33,440  
most important especially the ones at 13

257  
00:08:35,909 --> 00:08:34,800  
so let's take a look at these well

258  
00:08:37,350 --> 00:08:35,919  
obviously what i want to look at is

259  
00:08:39,269 --> 00:08:37,360  
temperature i just got to finish telling

260  
00:08:41,269 --> 00:08:39,279  
you about temperature and viscosity and

261  
00:08:42,870 --> 00:08:41,279  
how this is related so i want to take a

262  
00:08:45,269 --> 00:08:42,880  
look at temperature right now what are

263  
00:08:48,230 --> 00:08:45,279

the melting points of these particular

264

00:08:51,190 --> 00:08:48,240

waxes these particular n alkanes have

265

00:08:54,070 --> 00:08:51,200

melting points starting at 47 degrees

266

00:08:56,150 --> 00:08:54,080

celsius and going all the way up to 66

267

00:08:58,470 --> 00:08:56,160

degrees celsius

268

00:08:59,670 --> 00:08:58,480

so what what does this mean tom well

269

00:09:02,150 --> 00:08:59,680

work with me here there's a little bit

270

00:09:03,910 --> 00:09:02,160

more so if i take a look at these 118

271

00:09:08,230 --> 00:09:03,920

right now i know that most waxes have a

272

00:09:09,829 --> 00:09:08,240

melting point between 47 and 95 degrees

273

00:09:13,990 --> 00:09:09,839

celsius

274

00:09:16,870 --> 00:09:14,000

most insects are active between

275

00:09:18,150 --> 00:09:16,880

10 and 35 degrees

276

00:09:20,230 --> 00:09:18,160

celsius

277

00:09:22,550 --> 00:09:20,240

there's no overlap below their

278

00:09:24,870 --> 00:09:22,560

respective melting points waxes take on

279

00:09:27,110 --> 00:09:24,880

one of four different crystal structures

280

00:09:29,350 --> 00:09:27,120

platelets tubules films and rodlets i

281

00:09:30,790 --> 00:09:29,360

really don't care what they take on all

282

00:09:32,150 --> 00:09:30,800

i'm interested in right now is that

283

00:09:33,990 --> 00:09:32,160

they're crystalline or in a

284

00:09:35,350 --> 00:09:34,000

semi-crystalline state

285

00:09:37,590 --> 00:09:35,360

therefore the temperature at which

286

00:09:40,150 --> 00:09:37,600

insects are most active

287

00:09:41,190 --> 00:09:40,160

the waxy layer is in a semi-crystalline

288

00:09:43,750 --> 00:09:41,200

state

289

00:09:45,829 --> 00:09:43,760

is this a problem it is for our diver

290

00:09:48,150 --> 00:09:45,839

and it will be for the insects

291

00:09:49,990 --> 00:09:48,160

diffusion can only occur efficiently in

292

00:09:51,910 --> 00:09:50,000

gaseous or liquid states i hope i'm not

293

00:09:53,829 --> 00:09:51,920

telling you anything you don't know

294

00:09:56,389 --> 00:09:53,839

things don't diffuse quickly through

295

00:09:58,310 --> 00:09:56,399

solid materials it can happen but it