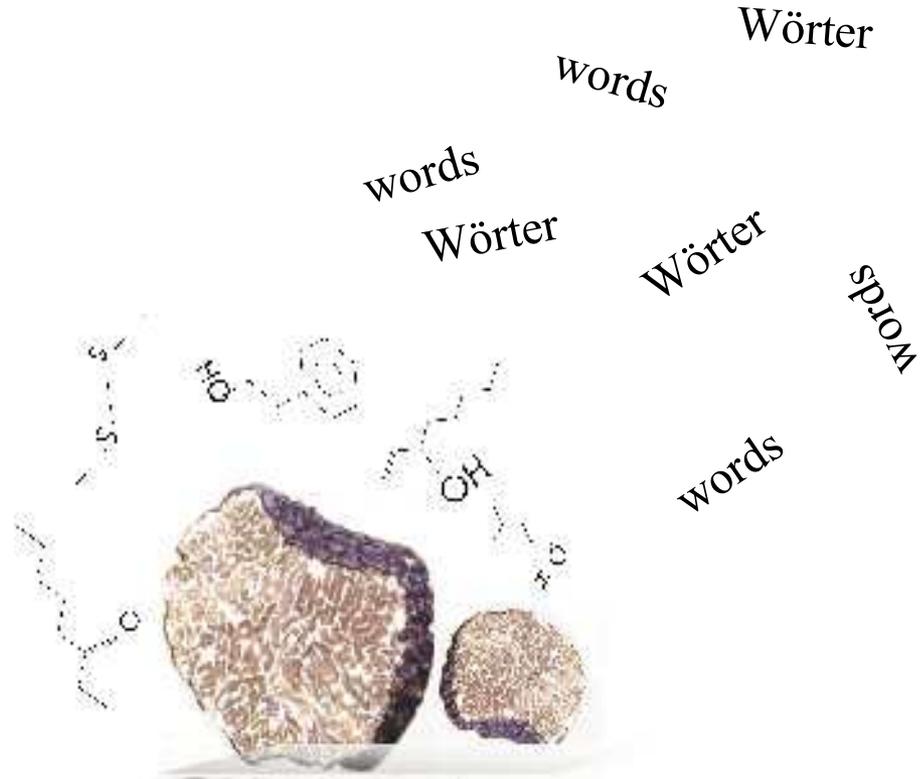


Das Geheimnis der Trüffelsprache



Richard Splivallo
University of Göttingen

Trüfflesymposium for Ahrtrüffel, 3 Oct 2011

Truffle culture \neq intensive agriculture

Truffle field in Italy



Mais field in USA



Source: www.spiegel.de

- Production variable
- Low yield
- Unstable over years

- Production maximized
- High yield
- Stability over years

The principle of symbiosis

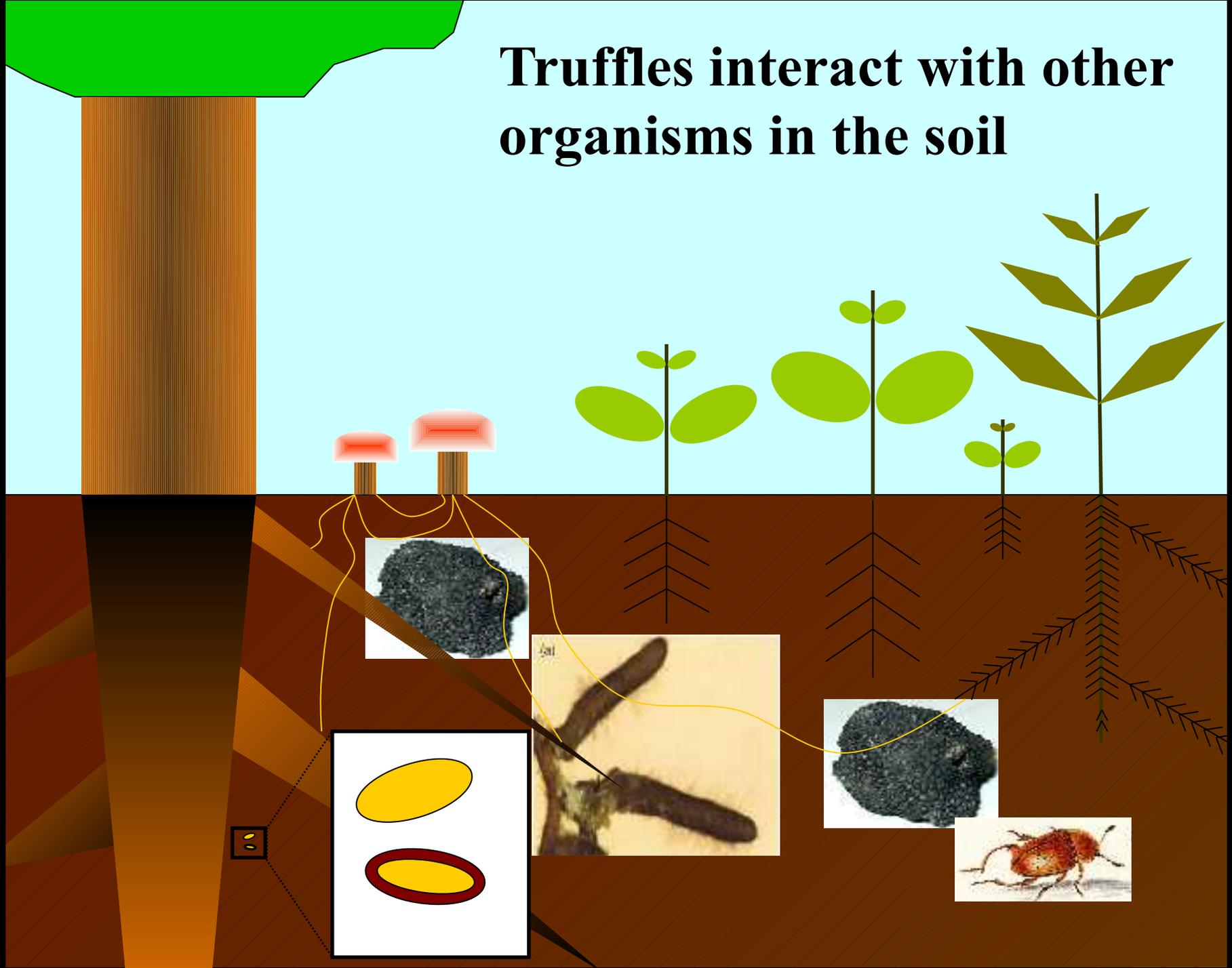
Sugars
Nutrients

Truffle filaments + tree roots

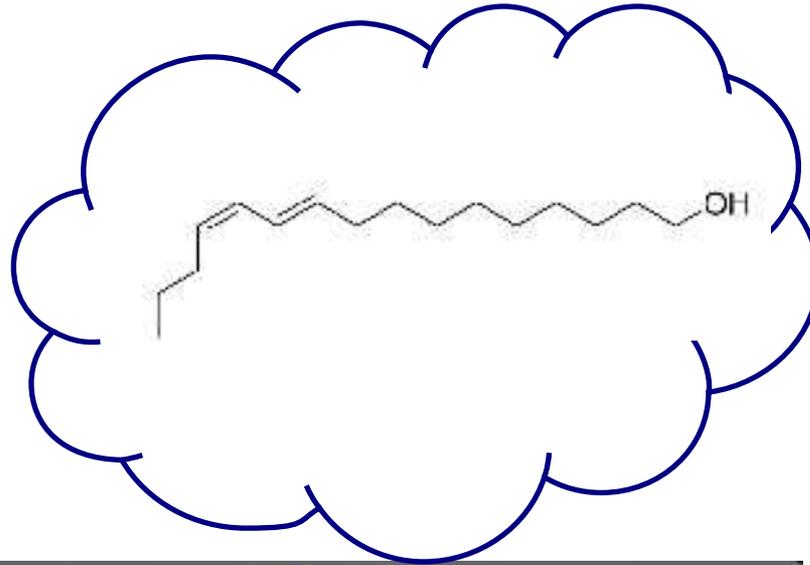


Symbiosis

Truffles interact with other organisms in the soil



The “molecular language” of silkworm moths

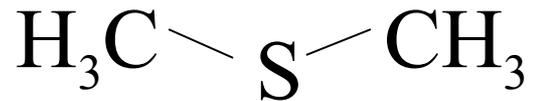


“Bombykol”

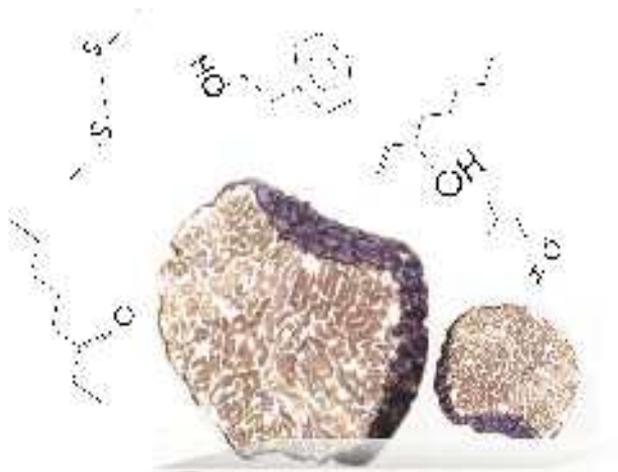
The sex pheromone



Why do dogs and pigs find truffles?



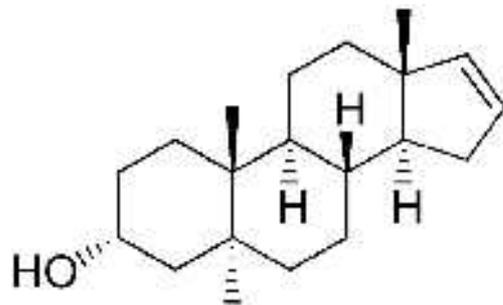
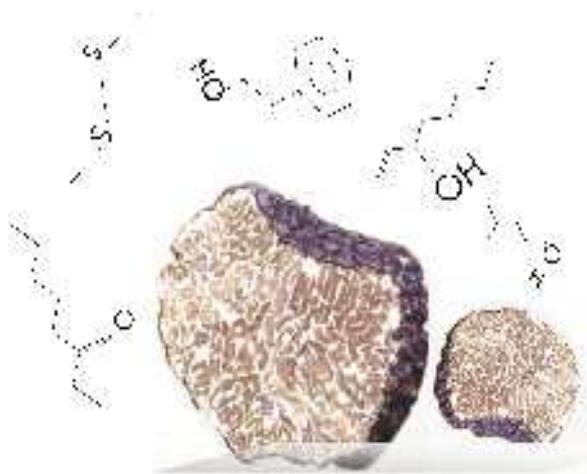
Dimethyl sulfide



Why do dogs and pigs find truffles?



Dimethyl sulfide

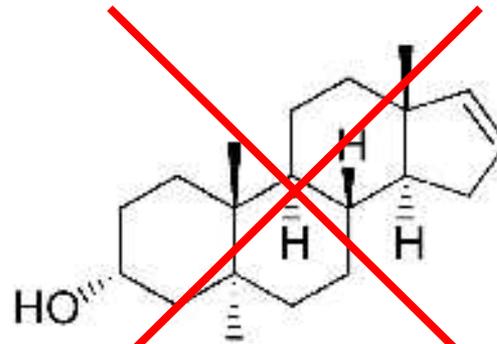
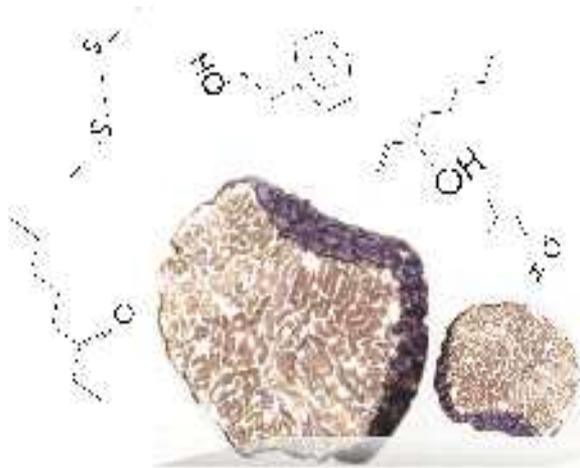


Androstenol

Why do dogs and pigs find truffles?

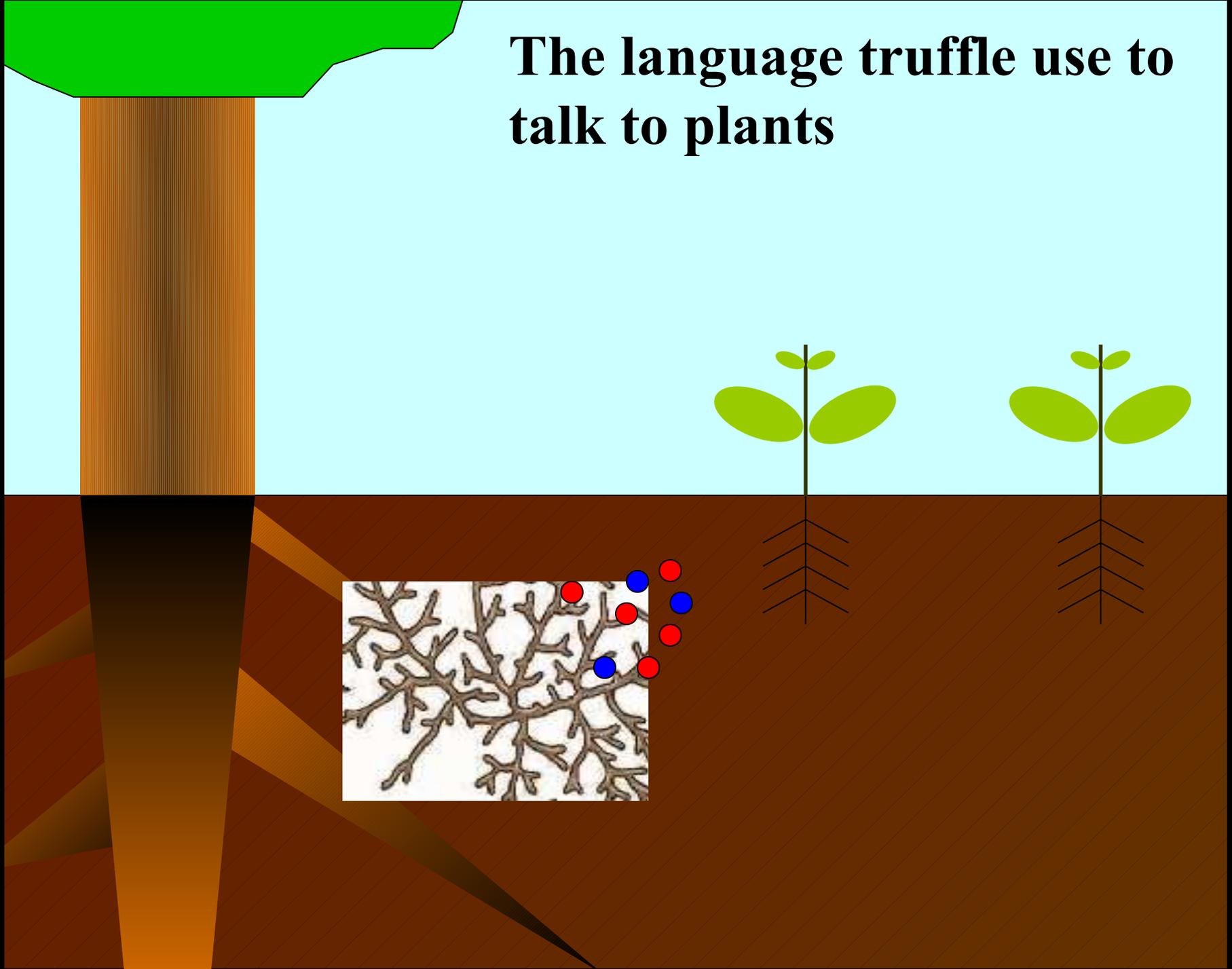


Dimethyl sulfide

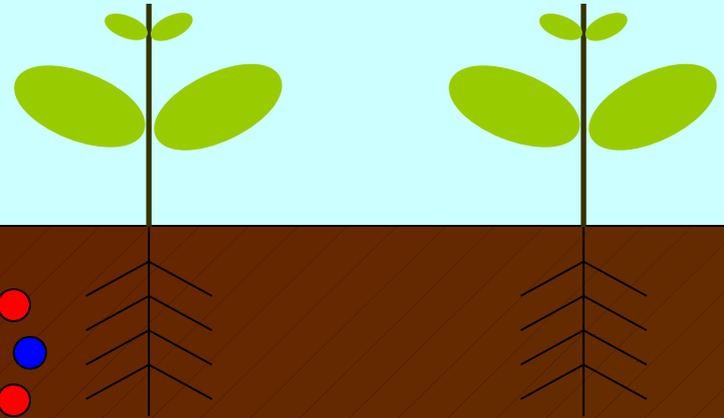
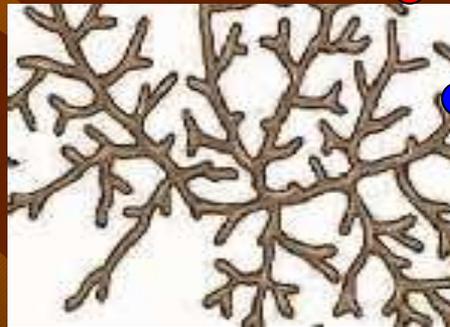


Androstenol

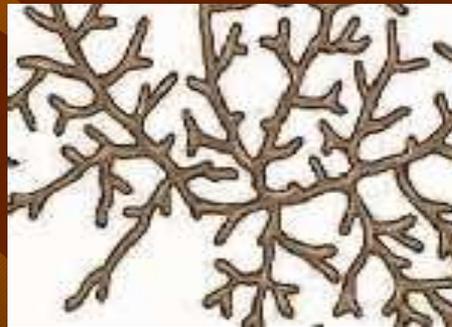
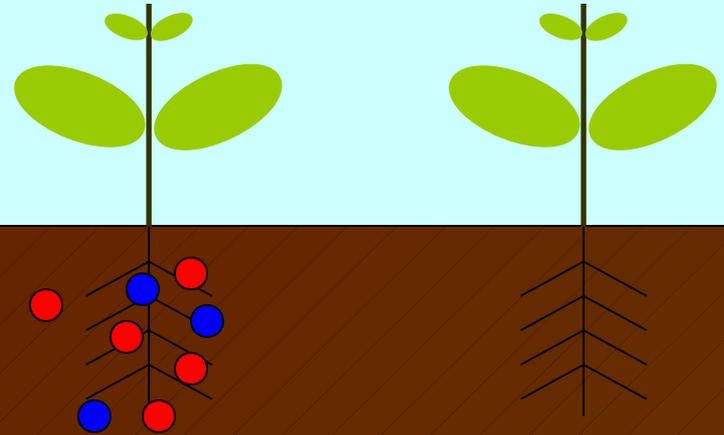
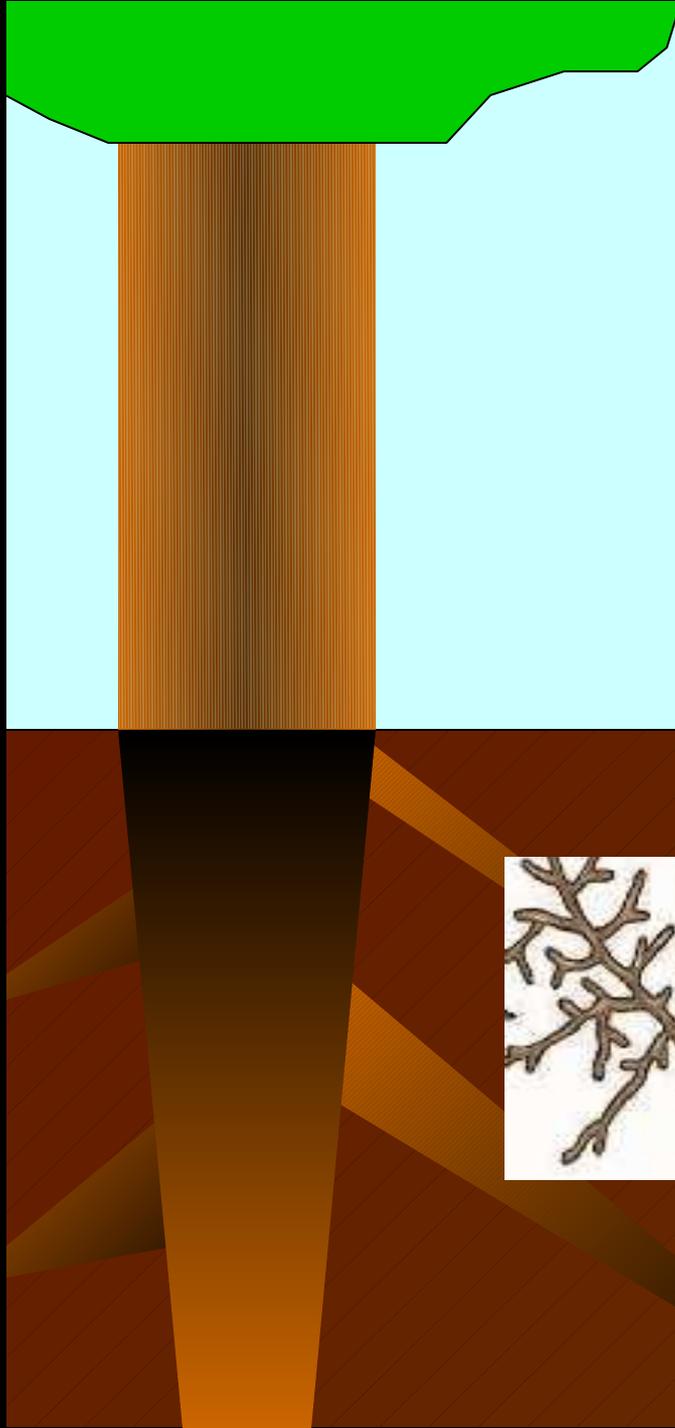
The language truffle use to talk to plants



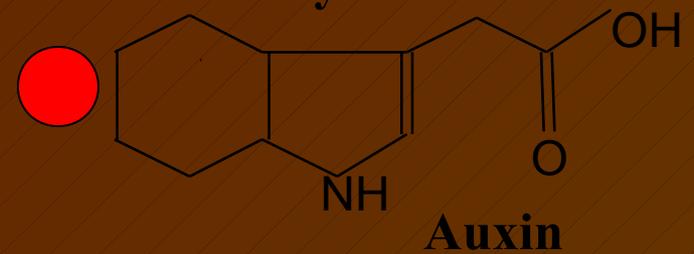
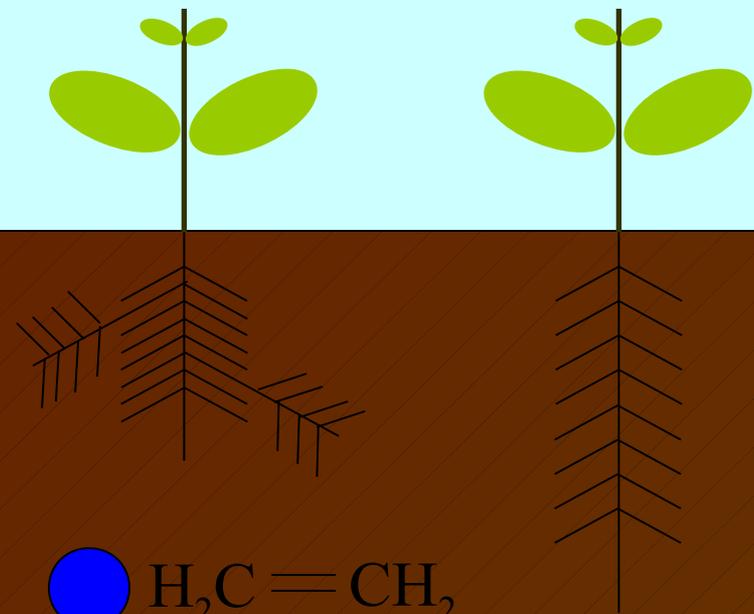
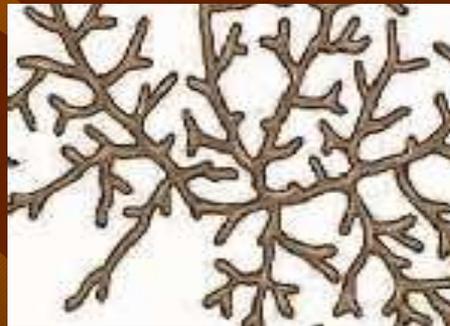
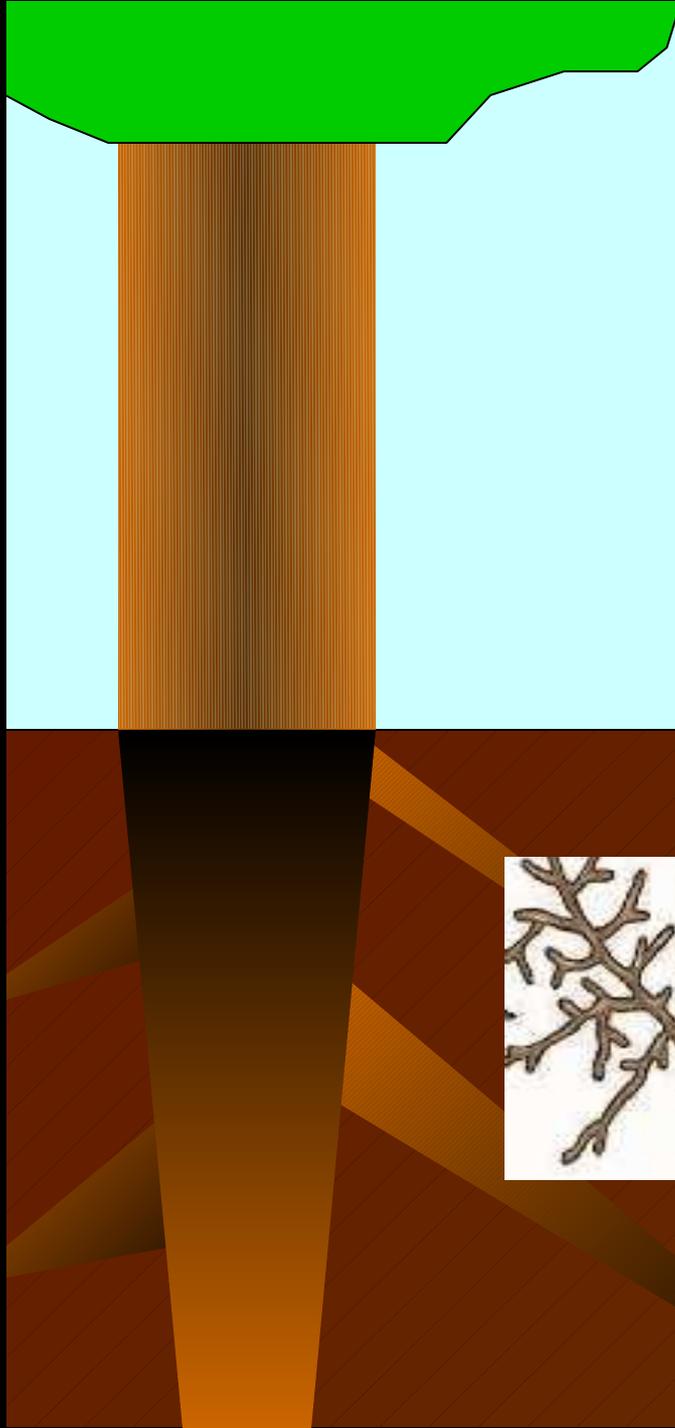
The language truffle use to talk to plants



The language truffle use to talk to plants



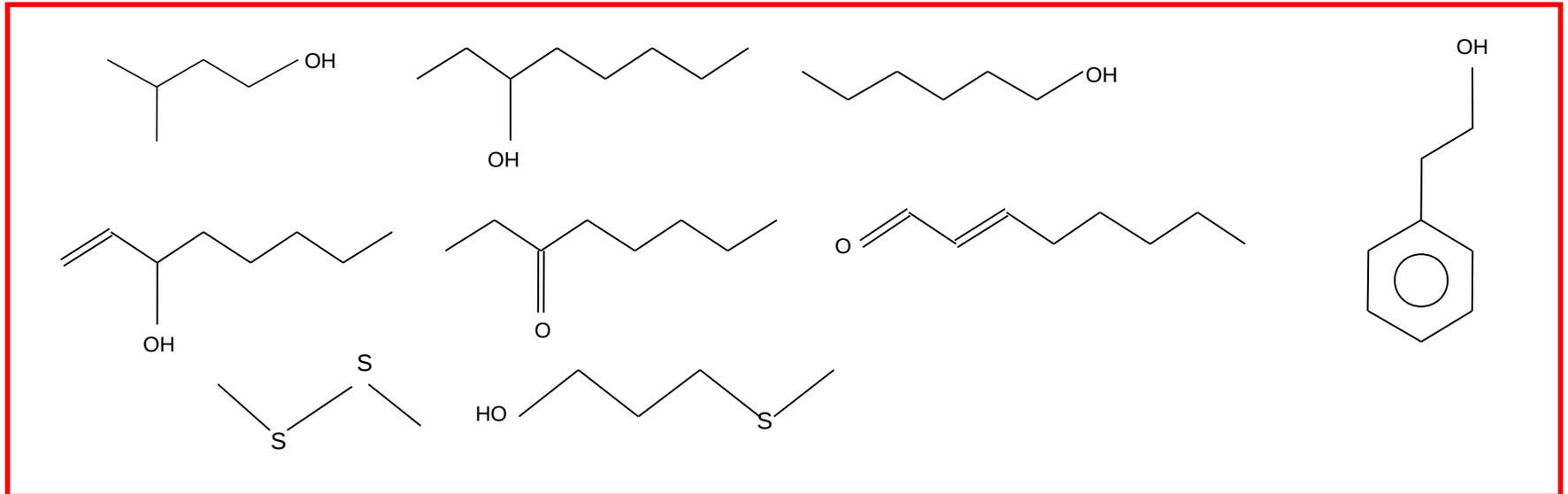
The language truffle use to talk to plants



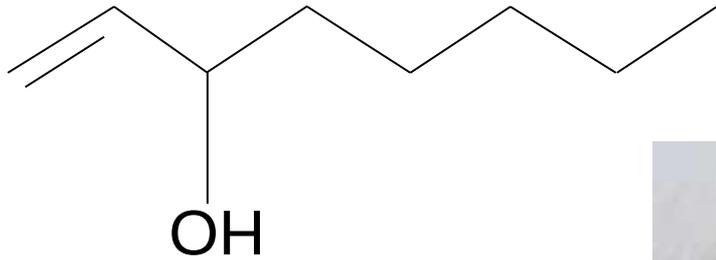
More than 200 “words”/volatiles produced by truffles



etc



1-octen-3-ol, a molecule with a typical fungal smell



www.friendcodes.com/forums/members/54030-albums3255-picture23768.html



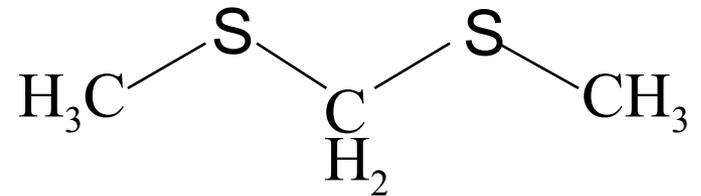
www.worldcommunitycookbook.org/season/guide/mushrooms.html

In fungi:

- Sex hormones
- Attracts insects

In truffles: ?

Dithiapentane: the smell of the Piedmont truffle



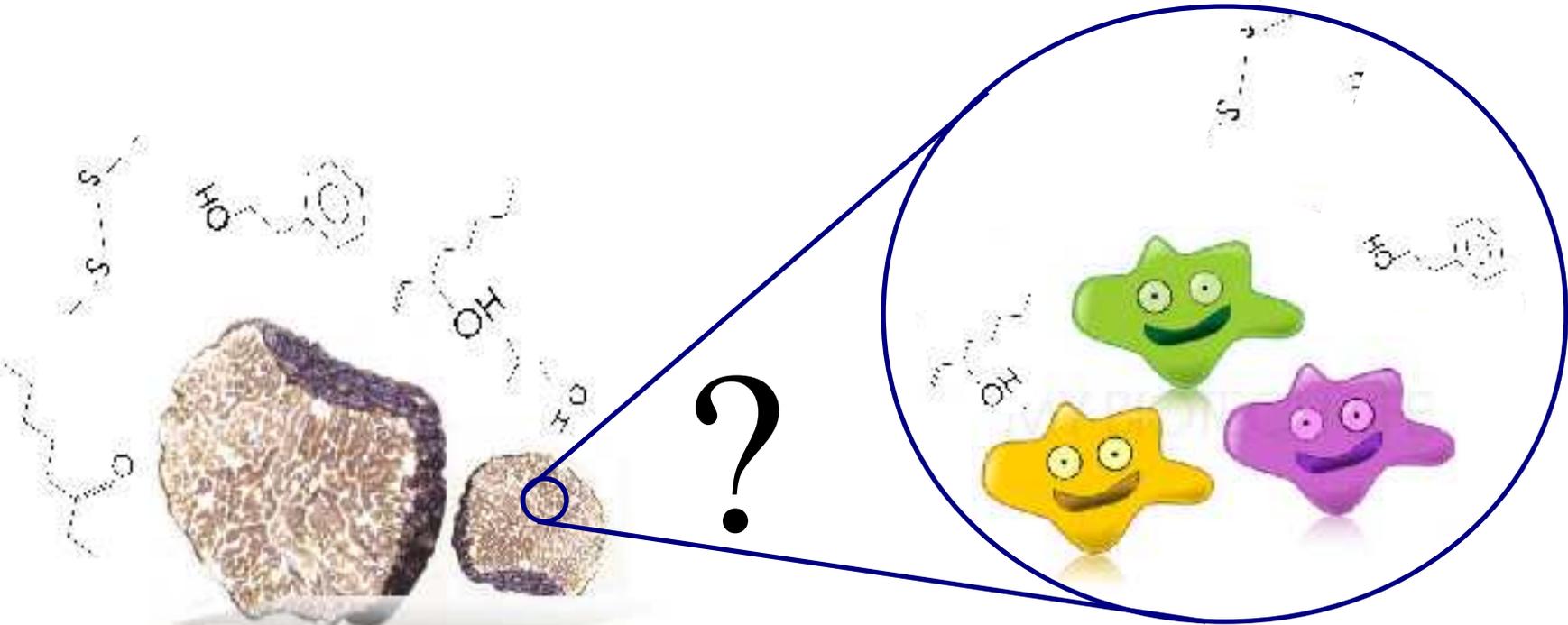
2,4-dithiapentane



Sulfur compounds in plants:

- antimicrobial agents
- In truffles: ?

Do microbes produce the smell of truffles?



Bacteria and yeast make cheese and wine



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<http://healthylifecarenews.com/wp-content/uploads/2010/11/Milk.jpg>



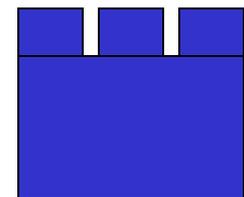
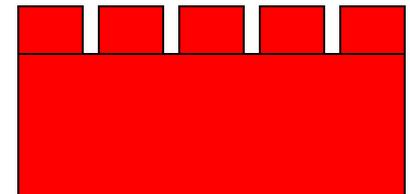
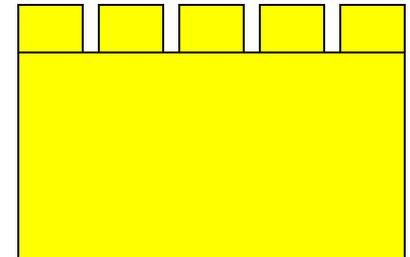
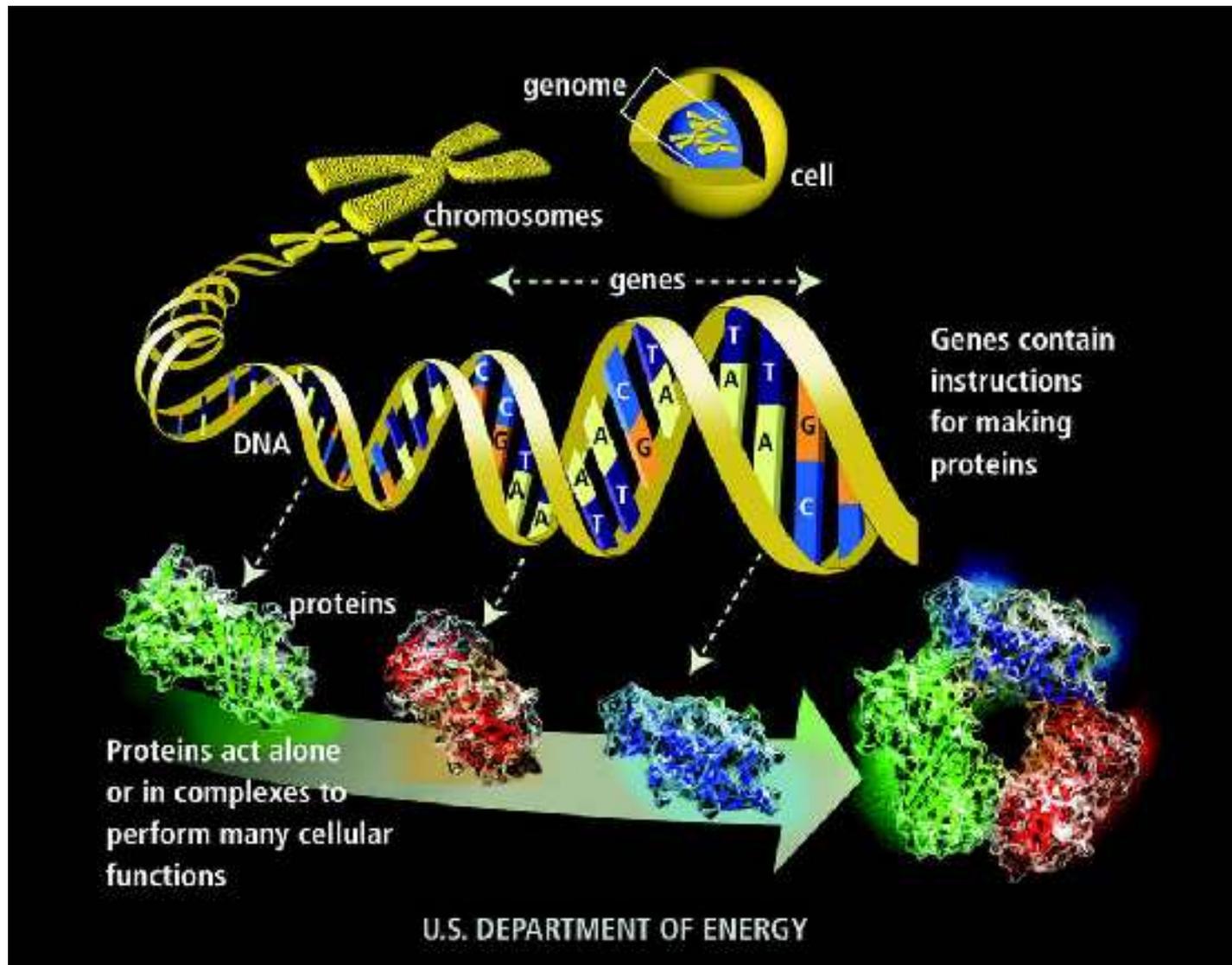
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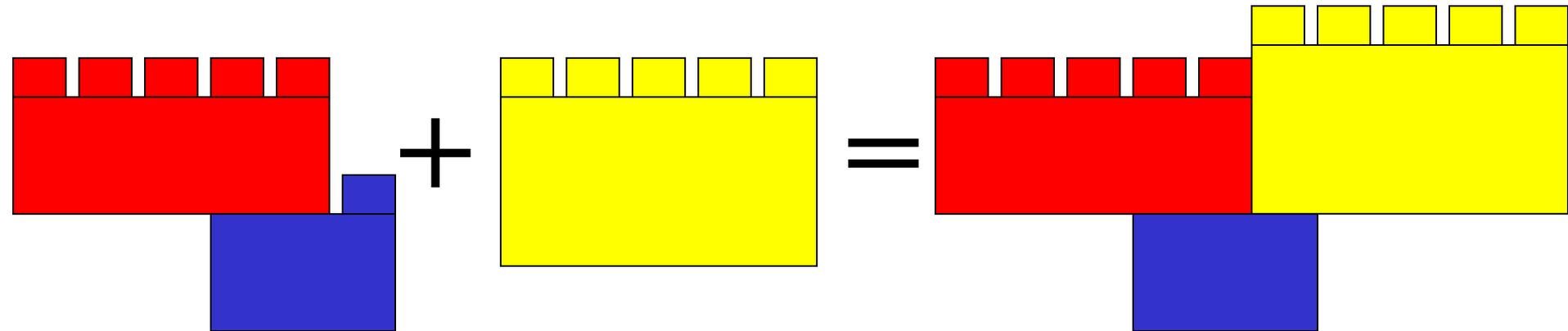
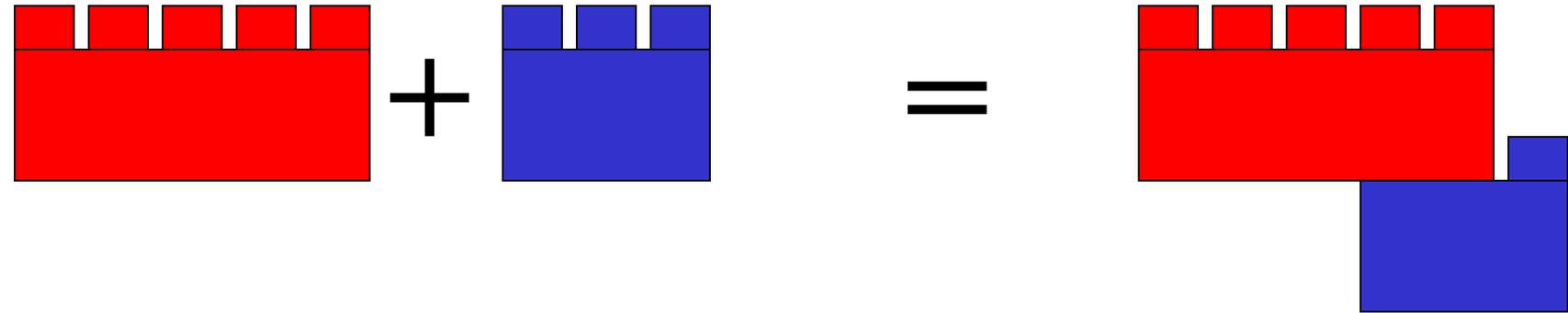


The genome



Lego[®]
building
blocks

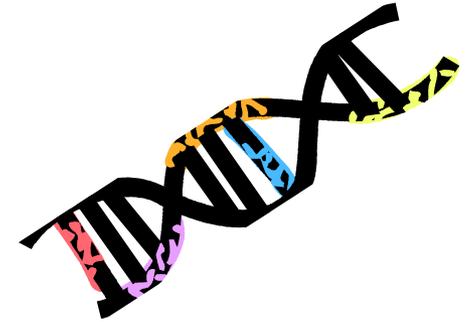
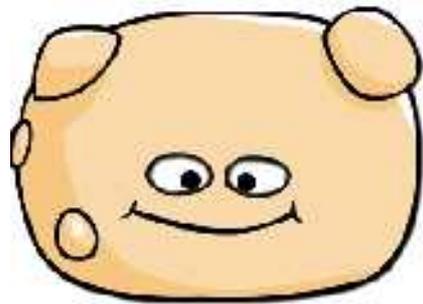
Enzymes assemble building blocks



Comparing the yeast and truffle genomes



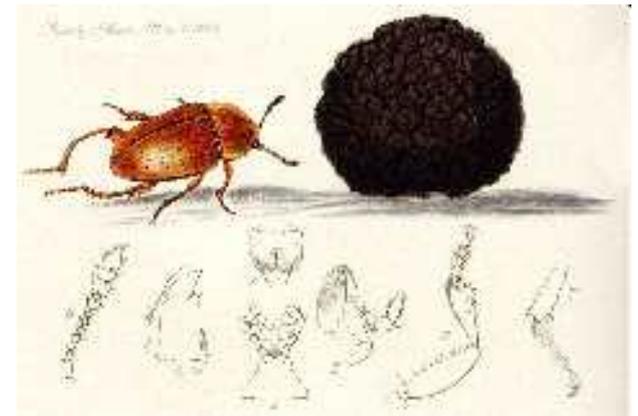
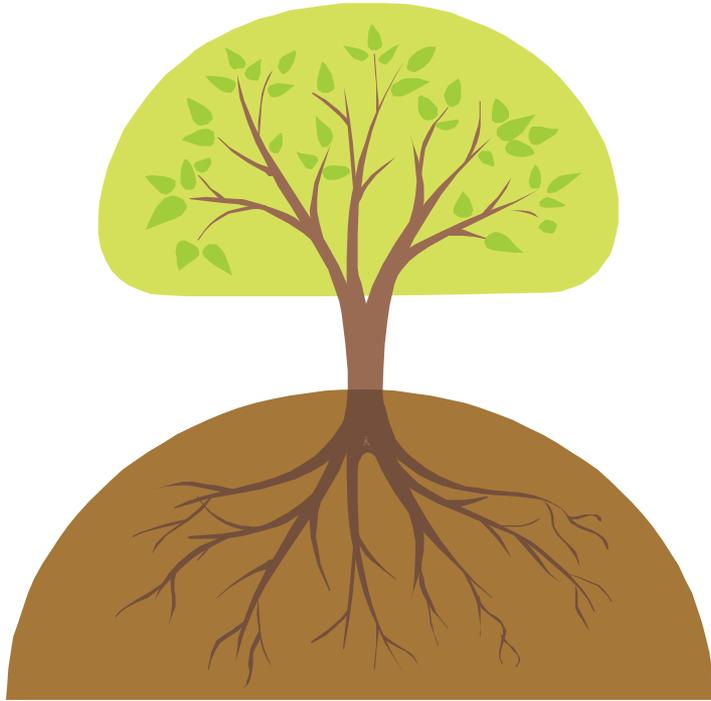
Yeast genome



Truffle genome



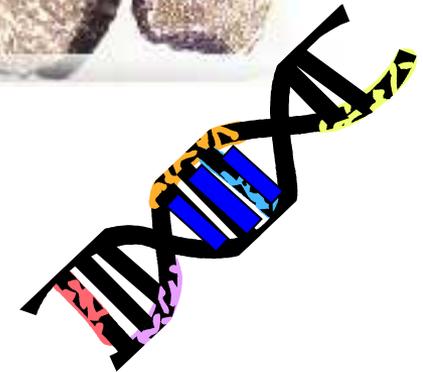
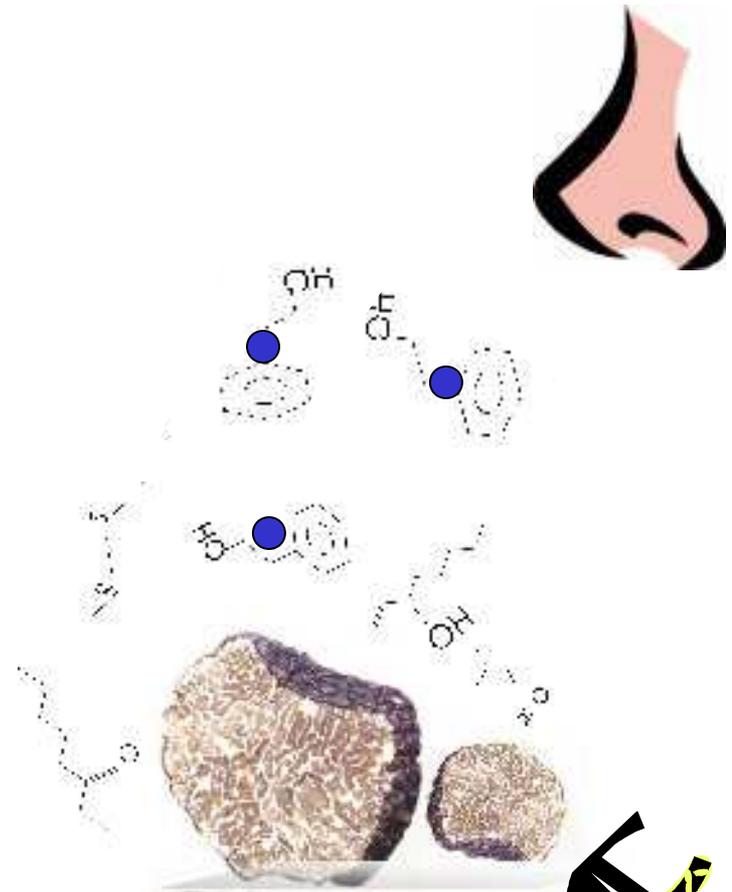
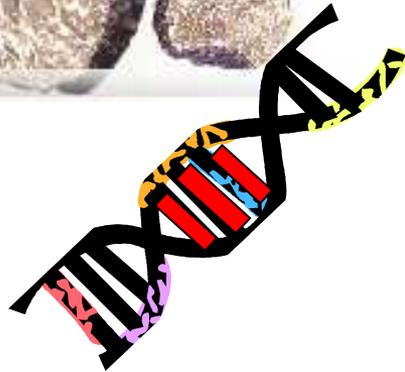
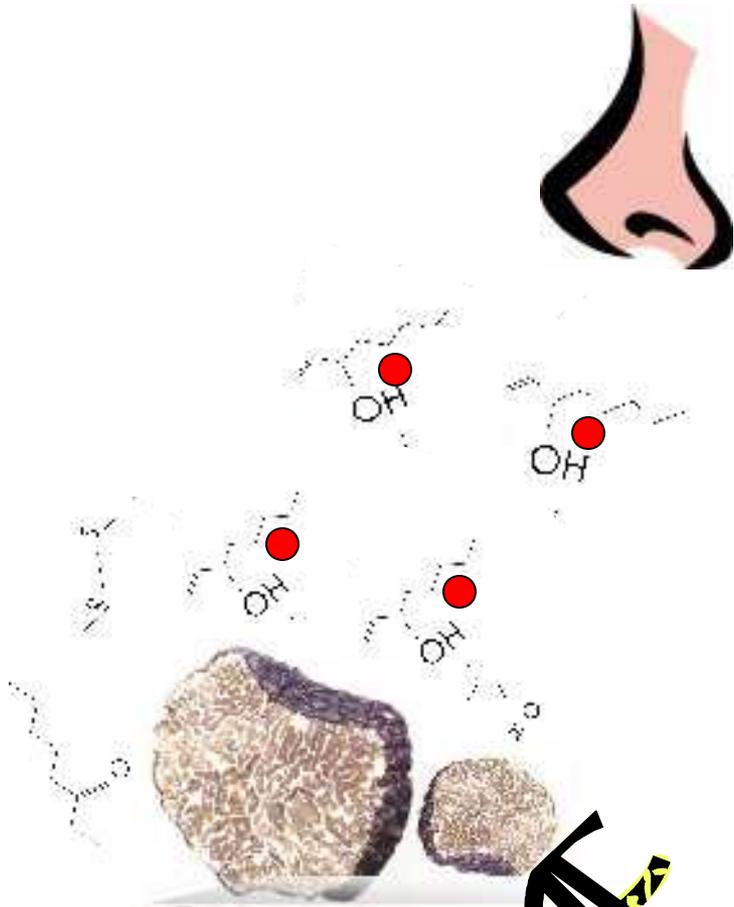
How can this research help truffle cultivation?



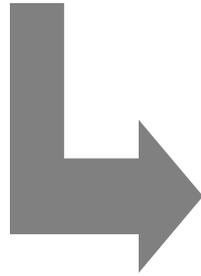
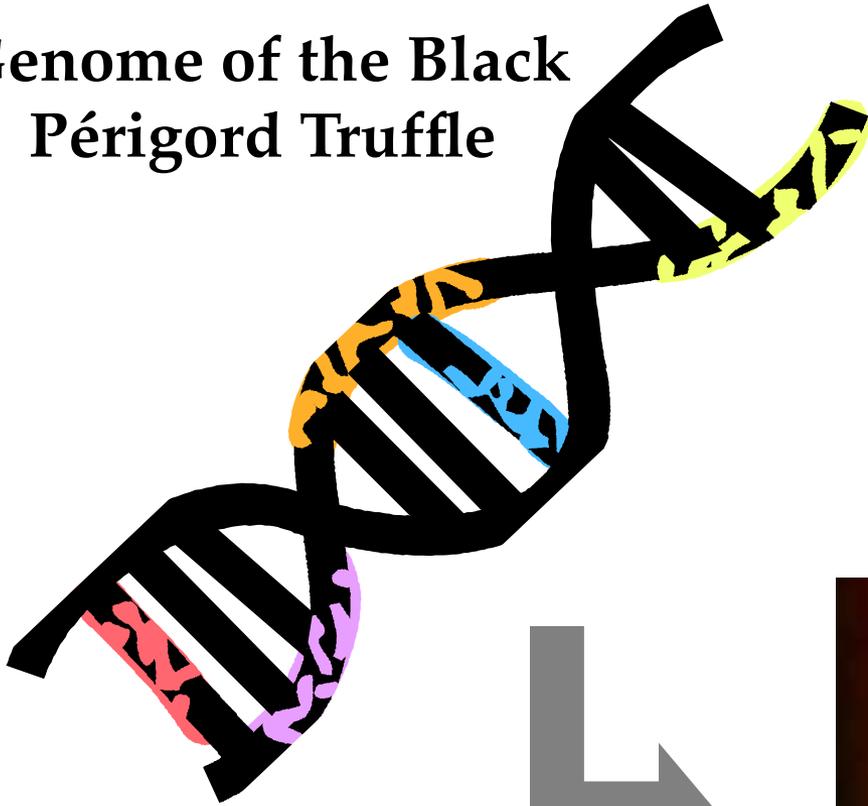
<http://www.trifolabianca.it>

- Insects: reduce pests and infestation
- Plants: increase mycorrhization, increase yield

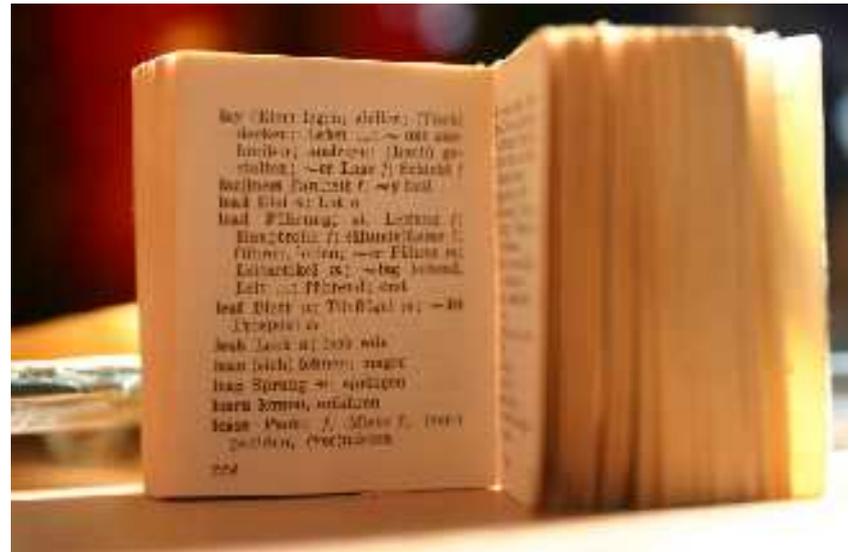
How can this research help truffle cultivation?



Genome of the Black Périgord Truffle



The Truffle Dictionary



The End

