Figures from Executive summary - Final report

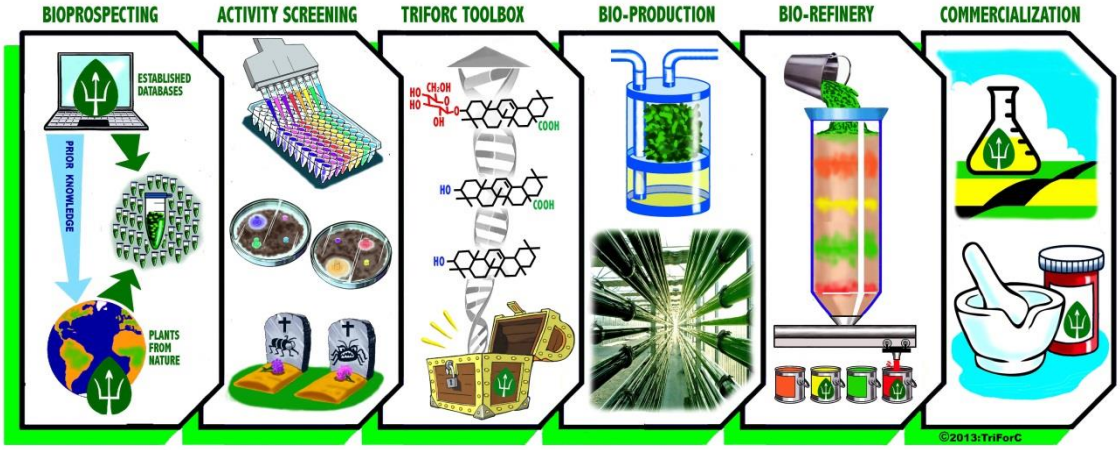
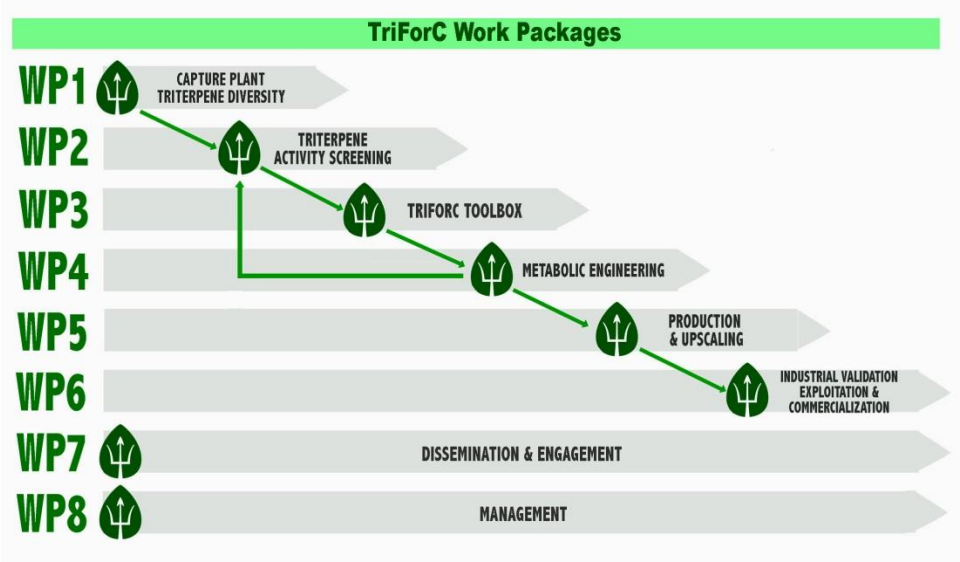


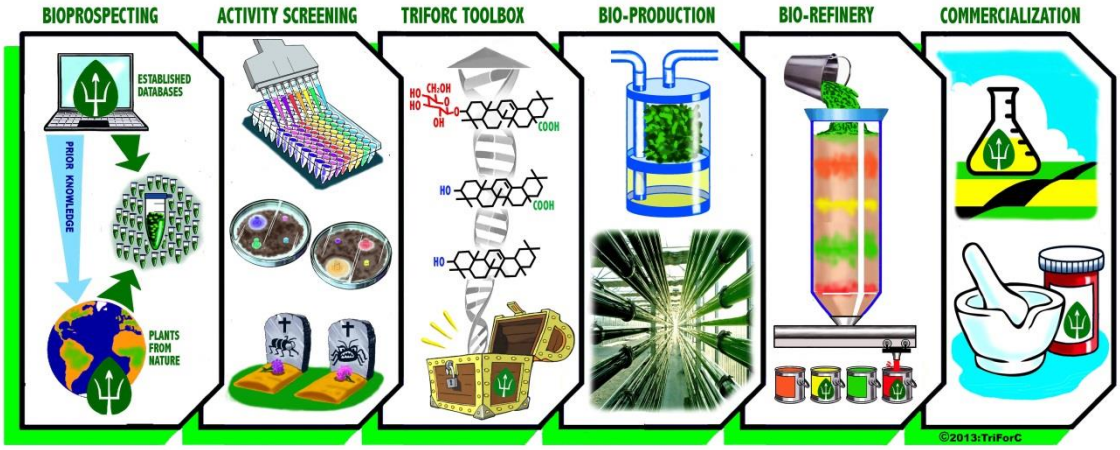
Figure 1 The TriForC pipeline for discovery and production of known and novel bioactive

triterpenes for pharmaceutical and agrochemical development. From bioprospecting, bioactivity screens, gene discovery to sustainable and industrially exploitable supply by in planta production systems.



Through six research and technological development (RTD) work packages (WPs), the TriForC partners have brought the consortium the necessary tools, resources, and methods to assemble the pipeline components from the beginning of the project (figure 2).

Figures from Summary description of project context and main objectives - Final report



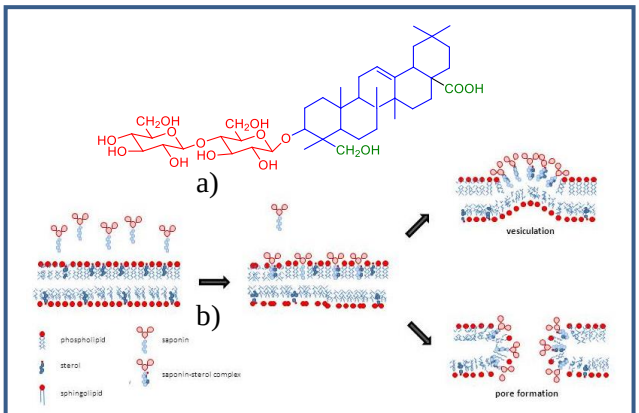


Figure. 1.2. a) Structure of the triterpenoid saponin hederagenin cellobioside b) saponins causing rupture of cell membranes.

Figures from main S&T results/foregrounds

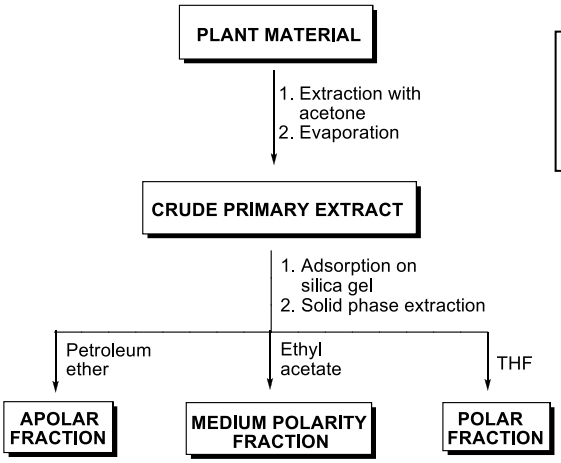
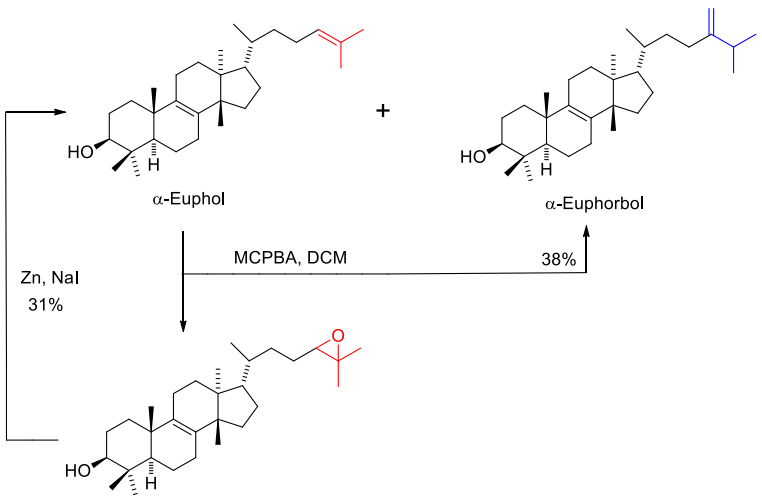
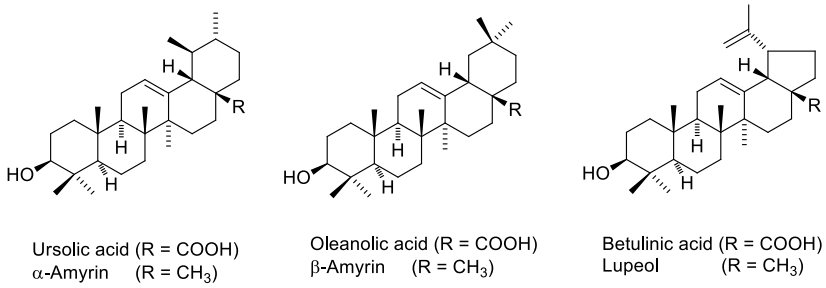


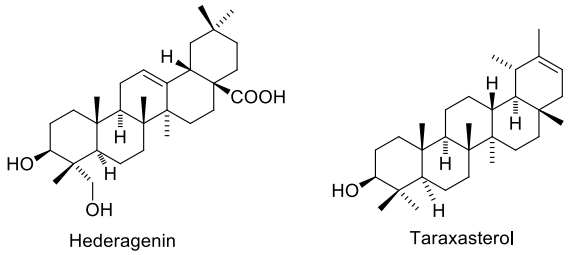
Figure 1. Extraction/Fractionation scheme used to build the TriForC extract library.



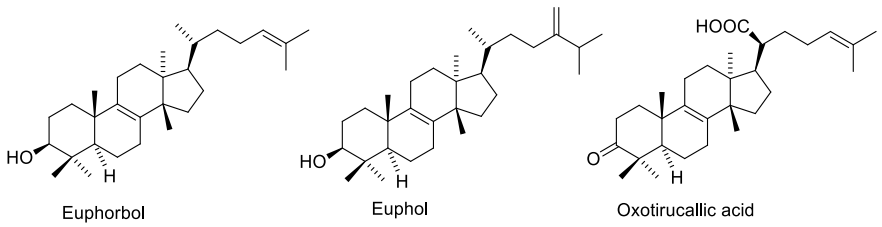
Scheme 1. Resolution of the αeuphol / α-euphorbol mixture by selective epoxidation/deoxygenation of α-euphol.



a) The three basic pentacyclic triterpenoid acids of dietary relevance (oleanolic, ursolic and betulinic acids) and their corresponding C-29 methyl analogues (β-amyrin, α-amyrin, lupeol)



b) a selection of selected structurally diversified pentacyclic triterpenoids that includes hederagenin and taraxasterol



c) a selection of bioactive tetracyclic triterpenoids that includes euphol, euphorbol, and oxotirucallic acid

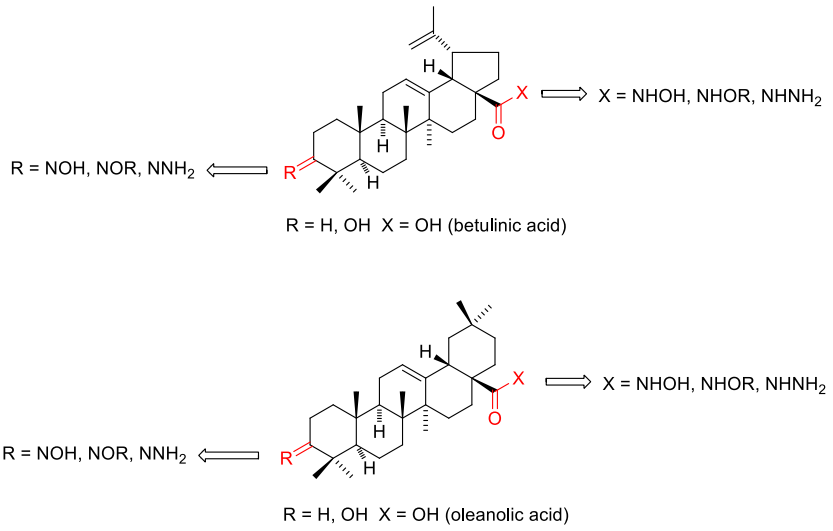


Figure 2. Exploration of the chemical space around triterpenoid leads by isosteric modification of carbon-oxygen double bonds

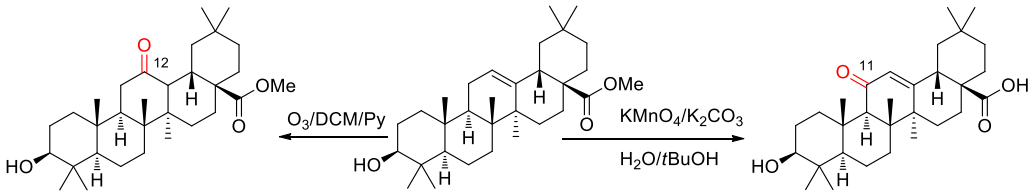


Figure 3. Introduction of oxygen functions on ring C (reaction with oleanolic acid as exemplificative).

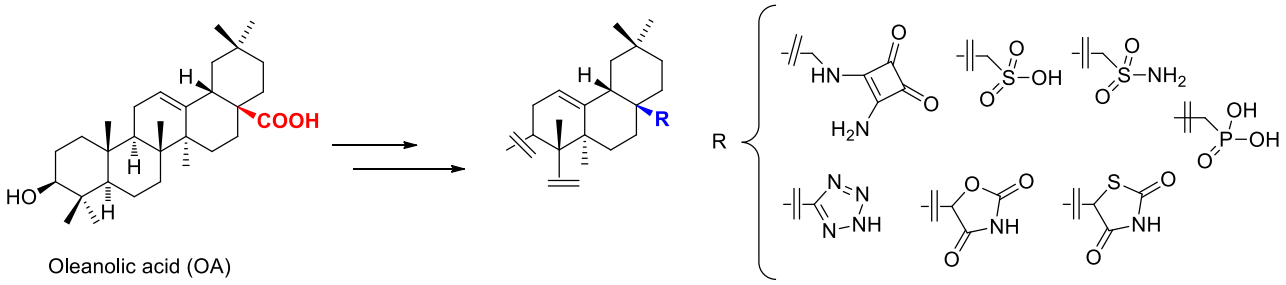


Figure 4: Isosteric modification of the carboxylate group of oleanolic acid

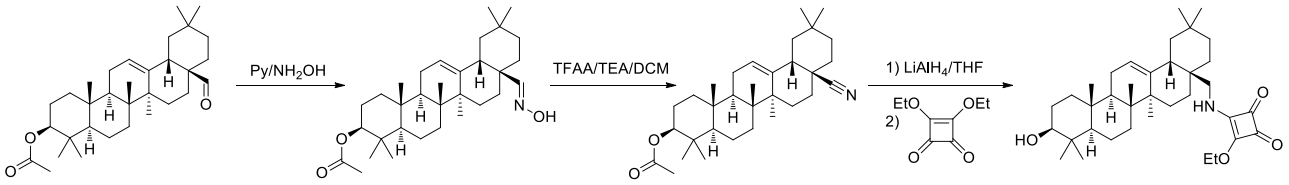
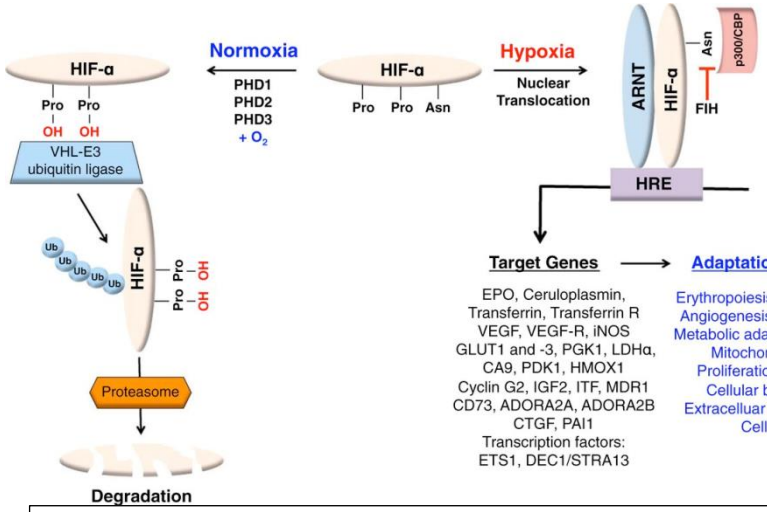


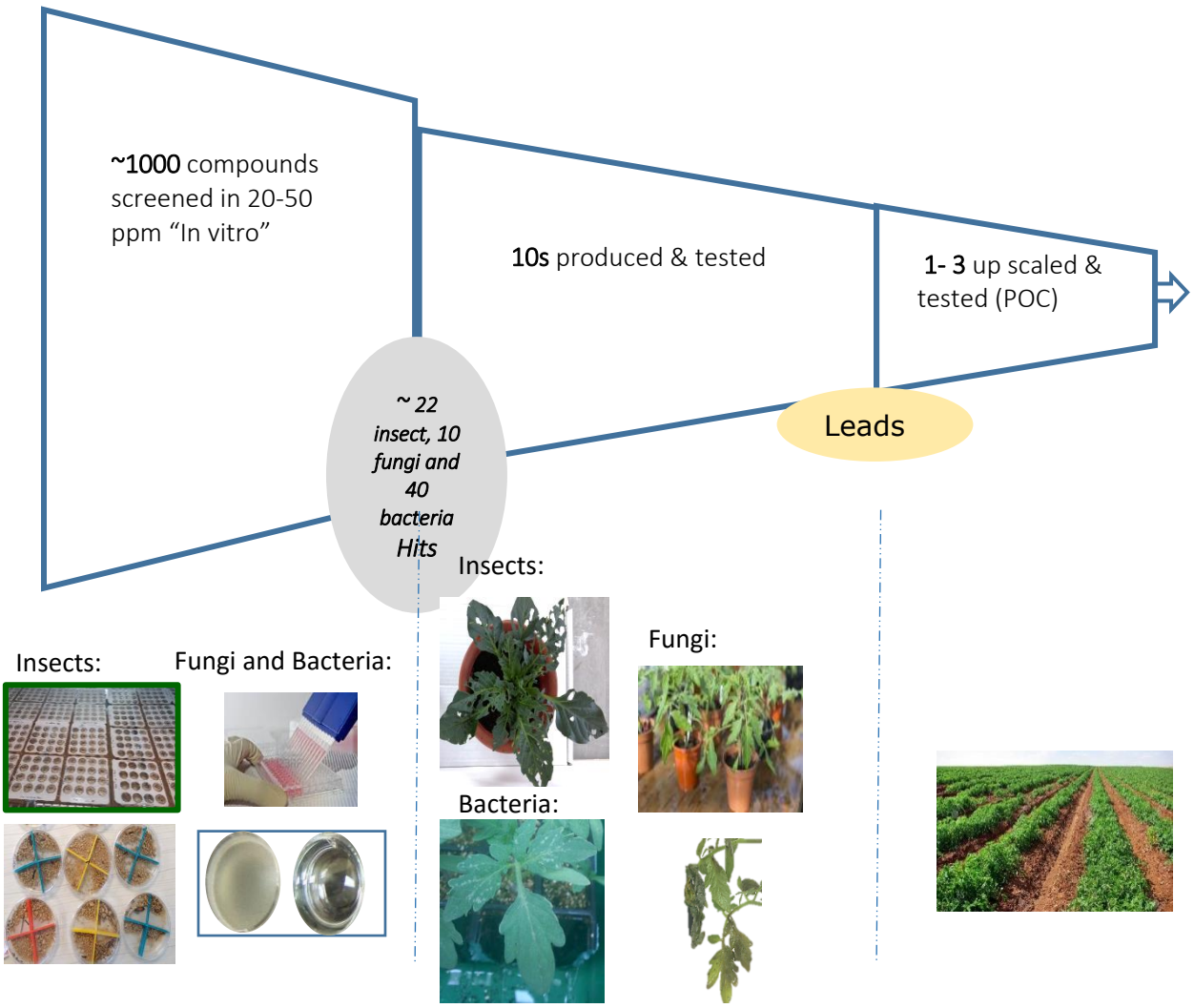
Figure 5: Synthesis of the squarate isoster of oleanolic acid

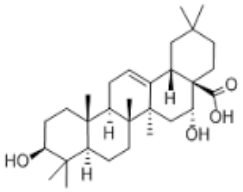


Clinical Applications:

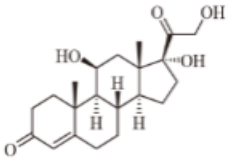
- Anemia in CKD (chronic kidney disease)
- Peripheral artery disease
- ESRD patients on hemodialysis
- Wound healing
- Inflammatory Bowel Disease
- CNS diseases (Stroke, Alzheimer, HD…
- Others…

Figure 6. Several derivatives of selected triterpenoid (OA, BA, UA, MA) that specifically bind PHD2 leading to stabilization of HIF-1α, and therefore showing a promising therapeutic potential as hypoximimetics (mimics low blood oxygen). Patent EP16193684.4.


~1000 compounds screened in 20-50 ppm “In vitro”
10s produced & tested
1- 3 up scaled & tested (POC)
~ 22 insect, 10 fungi and 40 bacteria Hits
Leads
Insects:
Fungi and Bacteria:
Insects:
Bacteria:
Fungi:



Echinocystic acid



Cortisol
(inflamation)

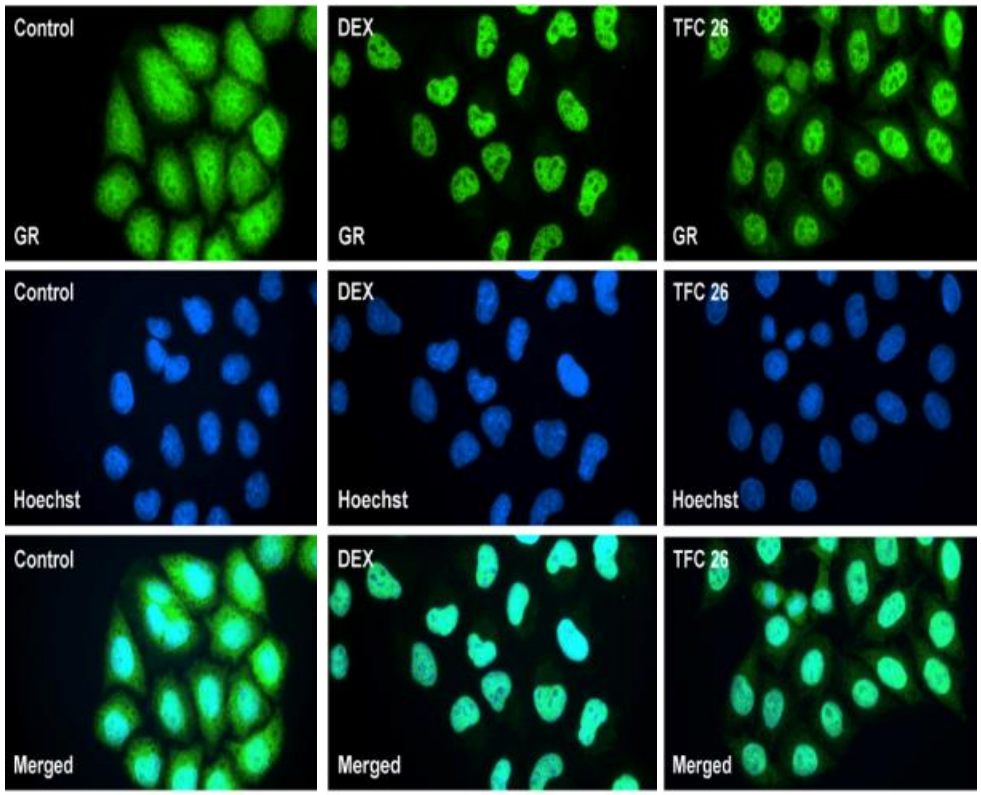


Table 1: Field trials and the compounds that were tested during M45-M48.

	Field /Greenhouse experiment	TrifocC compounds tested
1	Aphids in apple orchard	Euphol-euphorbol mix
2	Aphids in Guava orchard	Euphol-euphorbol mix
3	Leafhoppers in Grapevine	Euphol-euphorbol mix Betulinic acid Boswellic acid
4	Black vine thrips in Grapevine	Euphol-euphorbol mix Betulinic acid Boswellic acid
5	Nemaodes in lettuce pots	Euphol-euphorbol mix Boswellic acid
6	Thrips in Cucumber greenhouse	Euphol-euphorbol mix
7	Thrips in Cauliflower field,	Euphol-euphorbol mix
8	Whiteflies in Cauliflower field,	Euphol-euphorbol mix
9	Nematodes in cucumber	Boswellic acid
10	Cotton leafworm in Cauliflower,	Boswellic acid Betulinic acid Protopanaxatriol Euphol-euphorbol mix
11	Beet armyworm in pepper,	Boswellic acid Betulinic acid Protopanaxatriol Euphol-euphorbol mix