Substrates for Green Infrastructure

presented by Bruno Maggi and Federico Maffei
Contents of this presentation:

- Brief introduction of the company Europomice and its products

- **What makes volcanic rocks interesting for green infrastructure in urban environment**

- Significant results of some tests and experiments about the use of **volcanic rocks in green roofs**

- Examples of green roofs and green infrastructures built with volcanic media

- How to get in touch with Europomice representatives
Gross sales $ 7 million - about 300,000 tons yearly

over 70% of the products sold to the green sector nurseries, landscaping
LAPILLO

ENGINEERED SOILS made with VOLCANIC blends

PUMICE

Vulsini Volcanite from the Pleistocene period, naturally calcined at high temperature,

ZEOLITE

Zeolite, ZEOLITITE CHABAZITE TYPE
Zeolite total content ca. 58% (Chabasite 45%; Phyllipsite 13%)

www.europomice.com
The physical structure of these rocks makes them very interesting for roots and microbes....
Lapillo

The internal part of the rock is in fact composed of an enormous quantity of ducts having a very small/medium diameter, intercommunicating between themselves and also externally.

Pumice

alveolar texture of remarkable lightness, high porosity, it provides great water retention, slow release of liquids and great thermal insulation
Some significant Results of comparative trials with

<table>
<thead>
<tr>
<th>Comparison between Zeolites of different origin</th>
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<tbody>
<tr>
<td>Sample - Zeolites</td>
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<tr>
<td>Cabasite (Europomice, Toscana, Italy)</td>
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<tr>
<td>Clinoptilolite (Sardegna, Italy)</td>
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<tr>
<td>Clinoptilolite (Romania)</td>
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</tbody>
</table>

*The Zeolite Cabasite (Europomice) shows the highest water holding capacity*
GREEN ROOF MEDIA

EXTENSIVE

- mix of Sedum: 10% Sedum acre, 15% Sedum reflexum oxbow, 15% Sedum reflexum angelina, 20% Sedum atropurpureum, 15% Sedum album, 15% Sedum rubrotinctum, 10% Sedum floriferum.

INTENSIVE

- mix of grasses: 25% Lolium perenne, 25% Festuca ovina, 25% Poa pratensis e 25% Festuca arundinaceae.

**Fertilizer applied: none**

Media: 4” deep, lined by geotextile over and gravel

MEASURES : 1. Volumetric Water Content (VWC); 2. area covered by the vegetation (LGC) over time, measured by Digital Image Analysis (DIA).

Trials by Landlab, Italy [landlab.net](http://landlab.net)
Vulcaflor light (Europomice) shows the highest water holding capacity.

Trials by Landlab, Italy landlab.net
The plants (Sedum) initial growth in Vulcaflor light (Europomice) was the fastest: after 2 weeks (DAP 15) the vegetation coverage was twice the size of the other media.

After a month (DAP 34) Vulcaflor light still showed the largest vegetation coverage: +50% compared with Agricola 2000 Be + 80% compared with Lecagarden extensive.

Trials by Landlab, Italy landlab.net
**Vulcaflor** intensive showed the **highest vegetation coverage** compared with the other media on trial (+ 45 % vs Agr. 2000 and + 145 % vs Lecag). After 40 days Vulcaflor intensive maintains the highest vegetation coverage (+ 40%).

Trials by Landlab, Italy [landlab.net](http://landlab.net)
Project partially financed by the European community,
The LIFE programme is the EU’s funding instrument for the environment, co-financing pilot or demonstration projects

In 2015 the EU financed a study for developing Media for Green roofs in Malta. All the 6 soil media that passed the preparatory trials include volcanic rocks such as pumice and lapillo.

Europomice volcanic rocks have been extensively tested by Universities and research centers:
University of Milano, University of Padova, University Federico II Napoli, University of Modena e Reggio, University of Di Malta Landlab, MAC Minoprio

In the following table and chart the composition of the selected growing media is being reported.

<table>
<thead>
<tr>
<th>Media</th>
<th>MAC7*</th>
<th>MAC7/T</th>
<th>MAC7/FC</th>
<th>TA</th>
<th>MT1</th>
<th>MT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMICE</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>45</td>
<td>35</td>
<td>30</td>
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<tr>
<td>LAPILLUS</td>
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<tr>
<td>EX CRASHED CLAY</td>
<td>40</td>
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<td>40</td>
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<td>35</td>
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<tr>
<td>peat 0-25</td>
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<td>20</td>
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<td>15</td>
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<td>coconut fiber 0-25</td>
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<td>10</td>
<td>20</td>
<td>9</td>
<td>10</td>
<td>10</td>
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<tr>
<td>green compost</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>15</td>
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<tr>
<td>biochar</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>15</td>
</tr>
</tbody>
</table>

* There are two different versions of MAC7: MAC7/IT (in use in Italy) and MAC7/MT in use in Malta. The difference between these substrates is the type of biochar used in the mix. In the Italian version biochar is in pellet form, while in the Maltese version chippings are used.
COLLABORATIONS

Europomice has teamed up with numerous companies, Italian and international.

Europomice provides soil media tailored to the client’s specifications.

What you see depends on how you view the world.
To most people, this is just dirt.
To a farmer, it’s potential.

Volcanic Mixtures:
VULCAFLOR – VULCAGARDEN – VULCAMIX – VULCAPARK – VULCASOIL
**Vulcagarden**  
**ORNAMENTAL LAWNS**

- Sowing or laying lawn turf
- Spreading and levelling to a depth of 2 inches over the entire surface using Vulcagarden
- Original improved soil
- Site soil

**Lapillus**  
**VERTICAL FOREST**

**Vertical forest** realized in 2009-2014 with **Europomice Lapillus** as drainage

- 711 trees
- 5000 small bushes
- 15000 perennial plants

**Pumice & Lapillus**  
**GREEN ROOFS**

**LifeMedGreenRoof Project**  
**STORM WATER MANAGEMENT**

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- University of Malta
- Landlab, MAC Minoprio

**COMPOSITION OF THE SELECTED GROWING MEDIA**

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<tr>
<th>Components</th>
<th>Pumice</th>
<th>Lapillus</th>
<th>EX CRUSHED CLAY</th>
<th>peat O-25</th>
<th>coconut fiber O-25</th>
<th>green compost</th>
<th>bachiere</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC*</td>
<td>40</td>
<td>40</td>
<td>40</td>
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<td>MAC/T</td>
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<td>MAC/FC</td>
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<td>MT1</td>
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**Ornamental lawn** realized with **Europomice Vulcagarden**

- Square of Miracles  
  Pisa - ITALY

- Bosco Verticale  
  Milan - ITALY

**Architect** Studio Boeri  
**Realized by** Peverelli
Sport field realized in 2018 with a substrate including Zeolite of Europomice

- Akhmat Arena, Grozny, Chechen Republic - RUSSIA

Realized by Powergrass, Milan (Italy)

Green roofs realized in 2017 with Europomice Volcanic Soils

- CityLife SpA, Milan - ITALY

Hanging gardens realized with Europomice Volcanic Soils

- ENVIPark, Torino - ITALY
- Marina Verde Resort, Caorle (Venice) - ITALY
- Portello Park, Milan - ITALY

Realized by Zaha Hadid
Realized by Euroambiente-Peverelli Srl
Groundbreaking Held for Bedford Green House at 2865 Creston Avenue, Bedford Park, The Bronx

https://newyorkyimby.com/category/bedford-park

EDELMAN SULTAN KNOX WOOD / ARCHITECTS

Blue Sky Development Partners LLC

Billie Cohen, Ltd.
LANDSCAPE DESIGN STUDIO

Silman

Bedford Green House -- Rendering of 2865 Creston Avenue
Bedford Green House — Rendering of Rooftop Greenhouse

Blue Sky Development Partners LLC

Billie Cohen, Ltd.
LANDSCAPE DESIGN STUDIO
Plants “like” volcanic soils

- They are fertile because of their physical structure and chemical properties (BTW microbes also like them)

- **Volcanic rocks are clean:** free of toxic elements, residuals or weeds

- Europomice pumice, lapillo and zeolite, due to their open cell porosity and high cation exchange capacity, **perform very well** in terms of water holding capacity and habitability for plants

The use of **volcanic materials in engineered soils, with enhanced properties, is well established in Europe**

Europomice can provide soils, or single components, matching the client specifications and standards (ASTM, FLL) for GREEN Infrastructures, including green ROOFS
EUROPOMICE SRL

www.europomice.com

We provide light volcanic media for green roofs and nursery market. All the product can be supplied in bags, big bags or bulk.

Just call for an offer or if you have any question. Our service is custom made.

Call us today! All together we can change the world.

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Vulcanic minerals
naturally expanded
naturally light
Thank you!