



MICRO CARBON TECHNOLOGY™

HUMAGRO  
Harvesting Nature's Science™

**THANK YOU**  
 GRACIAS  
 ARIGATO  
 SHUKURIA  
 JUSPAXAR  
 DANKSCHEEN  
 SPASSIBO  
 NUHUN  
 SNACHALHUYA  
 CHALTU  
 YAQHANYELAY  
 TASHAKKUR ATU  
 WABEEJA MAITEKA  
 HUI  
 YUSPAGARATAM  
 SUKSAMA  
 EKHMET  
 HATUR GUI  
 MERCI  
 SPASIBO  
 DENKAUJA  
 NEMACHALINYA  
 UNALCHEESH  
 EKOJU  
 SIKOMO  
 GRAZIE  
 MEHRBANI  
 PALDIES  
 BOLZIN  
 MERCI  
 MAAKE  
 ATTO  
 BHANYAIDAAD  
 ANHA  
 MERASTAWHY  
 GAEJTHO  
 GOZAIMASHITA  
 EFCHARISTO  
 AGUYJE  
 FAKRAUE  
 KOMAPSUMNIDA  
 LAH  
 MINMONCHAR  
 MAKETRI  
 BIYAN  
 SHUKRIA  
 TINGKI

BIO HUMA NETICS



# preservar y restaurar

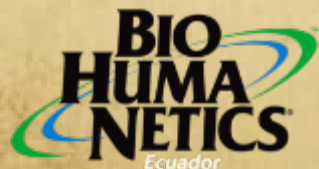
(Preserving and Restoring . . .)



# nuestro mundo de abundancia

(. . . Our World of Plenty)

# HUMAGRO™ Harvesting Nature's Science™



# Ecuador



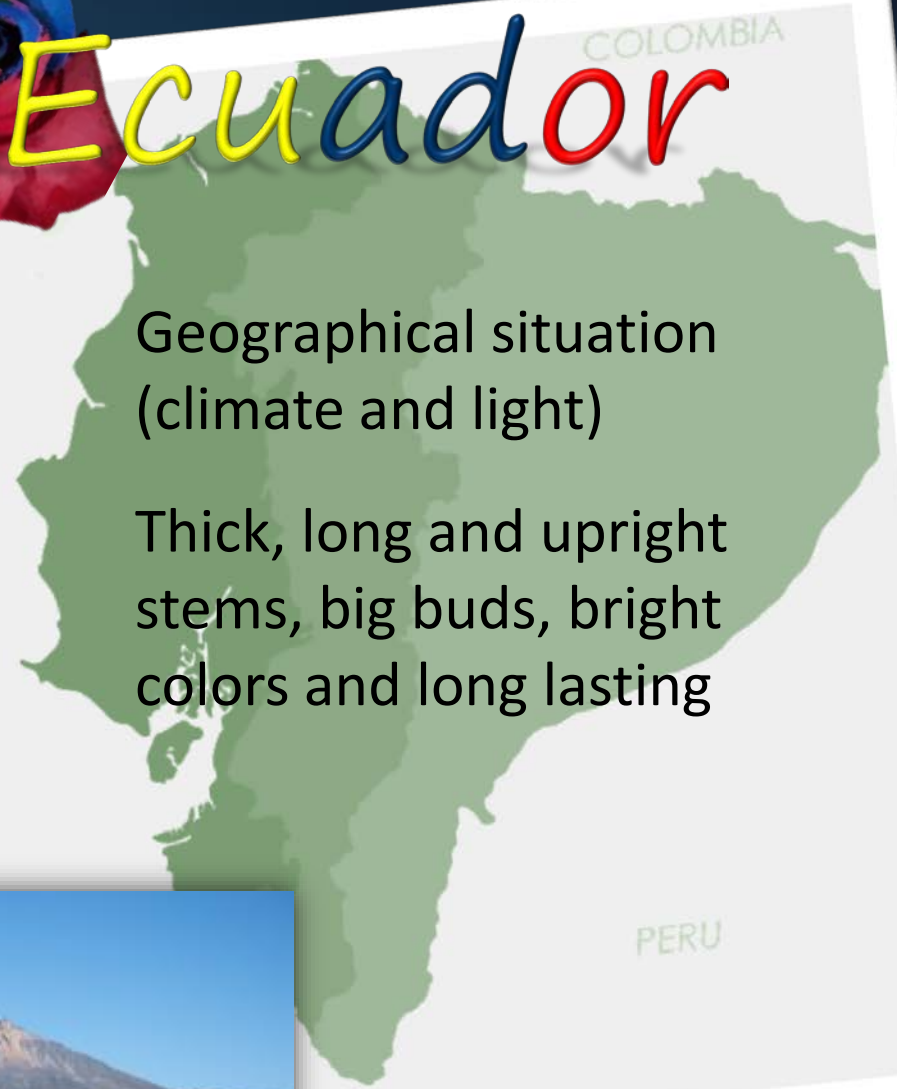
Ecuadorian flowers are considered as the best in the world because of their unparalleled quality and beauty.





Geographical situation  
(climate and light)

Thick, long and upright  
stems, big buds, bright  
colors and long lasting



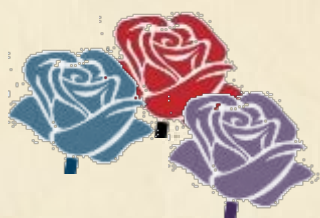


**MICRO CARBON TECHNOLOGY™**



**MAJOR FLOWER EXPORTING COUNTRIES**

- The Netherlands (Holland)
- Colombia
- Ecuador**
- Kenya
- Ethiopia
- Belgium
- Etc.



Total	4000 Ha
Average Plantation	7.1 Ha
Average Variety/ha	4.6
Average Variety/plantation	57

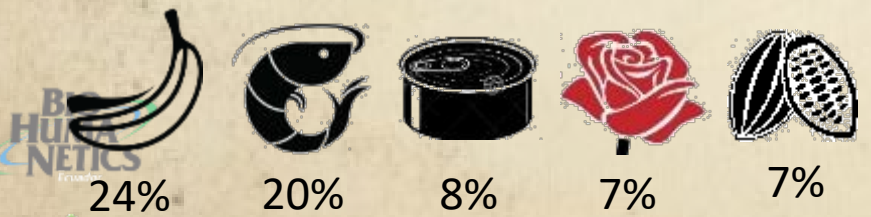
Oil Exports 2015



6,697,534 USD FOB (thousands)

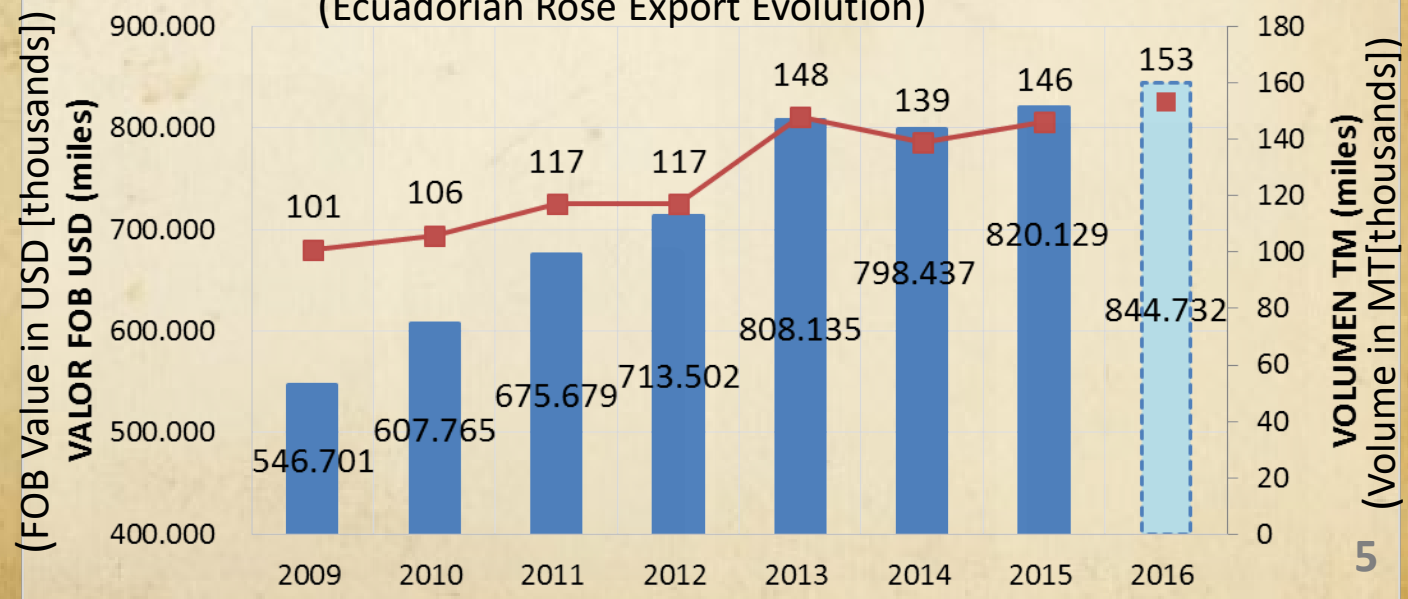
NON-oil Exports 2015

11,668,353 USD FOB (thousands)



66%

**Evolución Exportación Rosas Ecuatorianas**  
(Ecuadorian Rose Export Evolution)



# Soil

A NON-RENEWABLE RESOURCE

(2015 International  
Year of the Soil)



## OUR Soil Today



Experts estimate that there is **topsoil** available for only **60 years**

**1000 years** are required to generate between **2 and 3 cm** of soil.

**33%** of the global soil is moderately to highly degraded

due to

erosion, **salinisation**, compaction, **acidification**, chemical pollution and **nutrient depletion**

## Saving OUR Soils

Increasing the content of organic matter in the soils

Using **nutrients (fertilizers)** wisely

Maintaining the soil surface covered with vegetation

Promoting **crop rotation** and reducing erosion

It may result in an average increase of

**58% of crop yields**<sup>6</sup>



# What is the current challenge agriculture (floriculture) is facing?

“Producing MORE”

With limited resources

Uncontrollable

- Radiation
- Day length
- Rainfall
- Genetics

Partially  
controllable

- Temperature
- Humidity
- **Soil**
- Water – irrigation

Controllable

- Agricultural practices
- **Fertilization**
- Irrigation
- Plant health



	PH	EC	Nitrates	Ammonium	P	Zn	Cu	Fe	Mn	K	Ca	Mg	S	B	Na	Chlorides	M. O.
		mSiem/cm															%
Min.	5.5	<b>0.8</b>	50	20	15	8	5	50	20	50	<b>2000</b>	300	30	0.8		15	4
Max.	6.12	<b>1.5</b>	150	40	30	15	10	100	40	150	<b>3000</b>	600	60	1.2	<b>&lt; 40</b>	30	8
PLANTATION 1	6.12	<b>4.87</b>	242	32	46	25	5.8	70	165	278	<b>6332</b>	1380	455	5.4	<b>68</b>	57	5.20
PLANTATION 2	6.22	<b>4.12</b>	185	21	15	21	3.2	104	30	192	<b>2593</b>	602	735	2.2	<b>78</b>	57	2.80
PLANTATION 3	5.98	<b>8.34</b>	580	30	54	53	6.0	192	170	273	<b>6208</b>	1325	1640	8.8	<b>108</b>	68	4.90
PLANTATION 4	6.24	<b>3.81</b>	215	33	28	52.0	5.1	56	97	322	<b>7300</b>	737	75	4.4	<b>63</b>	46	4.50





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# Plant demands



- Nutrients

- Fertirrigation schedule (calculator)

- Available water and type of water

- Fertilizers to be used



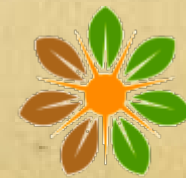
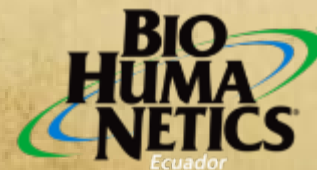
- Irrigation and fertilization equipment

- Analysis interpretation

- Integrated fertirrigation handling



# MICRO CARBON TECHNOLOGY™



yurakuna



Small organic carbon molecule (3-6 rings)

Healthier and more balanced plant

Smaller nutrient loss

Quick penetration

Less EC of the soil

Less energy consumption

Nutrients complex

Unique technology

# Determining the efficiency coefficient (E Co) for Roses Ecuador\*



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Without MCT

ml/cubic m dose	Foliar Analysis %	Requirement %
15.0	3.30	3.90
16.0	3.40	3.90
17.0	3.50	3.90
18.0	3.60	3.90
19.0	3.70	3.90
20.0	3.80	3.90
20.1	3.84	3.90
20.2	3.86	3.90
20.3	3.88	3.90
<b>20.4</b>	<b>3.90</b>	<b>3.90</b>
20.5	3.90	3.90
20.6	3.90	3.90

**SUPER NITRO®**

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**PHOS-MAX™**

**SUPER K™**

**CALCIUM**

**44 MAG®**

**SULFUR**

**IRON**

**MANGANESE**

**Z-MAX®**

**COPPER**

**BORON**

**COMOL**

ml/cubic m = 1 meq	E Co
35.90	20.40
93.39	6.50
81.56	5.00
143.88	12.40
193.02	11.20
761.90	11.20
330.08	125.00
481.84	91.50
298.26	87.50
558.17	34.75
61.14	30.43
1366.81	47.90

\* The E Co arose from observational trials and was measured through lab analysis



EC & pH CONTROL UNIT		
EC	1.88	mS/cm
pH	6.0	

Irrigation Water	
EC	0.20
pH	9.60

IRRIGATION CONCENTRATION					
FERTILIZER (ppm)	Water	TOTAL	mmol/l	meq/l	
NH <sub>4</sub> <sup>+</sup>	31	2.0	33	1.82	<b>1.82</b>
NO <sub>3</sub> <sup>-2</sup>	768	12.0	780	12.58	<b>-12.58</b>
SO <sub>4</sub> <sup>-2</sup>	151	19.0	170	1.77	<b>-3.54</b>
P <sup>+</sup>	19	1.0	20	0.65	<b>-0.65</b>
K <sup>+</sup>	160	8.0	168	4.29	<b>4.29</b>
Ca <sup>2+</sup>	117	20.0	137	3.42	<b>6.83</b>
Mg <sup>2+</sup>	39	12.0	51	2.09	<b>4.18</b>
Mn <sup>2+</sup>	1,611	0,020	1,631	0,030	<b>0,059</b>
Fe <sup>2+</sup>	2,080	0,010	2,090	0,037	<b>0,075</b>
Zn <sup>2+</sup>	0,375	0,010	0,385	0,006	<b>0,012</b>
Cu <sup>2+</sup>	0,645	0,020	0,665	0,010	<b>0,020</b>
B <sup>3+</sup>	0,036	0,010	0,046	0,004	<b>-0,013</b>
Mo <sup>2+</sup>	0,502	0,020	0,522	0,005	<b>0,011</b>
Cl <sup>-</sup>		7	7	0,197	<b>-0,197</b>
Na <sup>+</sup>	0,038	21	21	0,915	<b>0,915</b>
Si <sup>4+</sup>		26	26	0,927	<b>3,706</b>
HCO <sub>3</sub> <sup>-</sup>		160	31.0	0.69	<b>-0,689</b>
<b>TOTAL</b>	<b>1289.9</b>	<b>288.1</b>	<b>1449.0</b>	<b>29.44</b>	<b>0.54</b>
<b>Neutralized Bicarbonates in Water (ppm)</b>					<b>129.0</b>

# HUMA GRO® Commercial Product Recommendation

meq/l  
Commercial Product (CP)

=

$$\% \text{ CP (g/100g)} * \delta \text{ (g/ml)} * (1 \text{ eq/Peq g}) * 1000 \text{ meq/eq} * 1000 \text{ ml/l}$$

## EXAMPLE

## CALCIUM Ca input

CALCIUM meq/l = 6950 meq/l

$$(10 \text{ g/100 g}) * (1.39 \text{ g/ml}) * (1 \text{ eq/20 g}) * (1000 \text{ meq/eq}) * (1000 \text{ ml/l})$$

CALCIUM recommendation = V \* C meq/cubic m = 143.88 ml/cubic m

$$((1 \text{ meq} * 1000 \text{ ml}) / 6950 \text{ meq/l}) * 1000$$



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## Average Nutritional Requirement of a rose plantation

element	unit	requirement
NH4+	meq	1.82
NO3-2	meq	12.58
SO4-2	meq	3.54
P	meq	0.65
K+	meq	4.29
Ca++	meq	6.83
Mg++	meq	4.18
Fe	meq	0,059
Mn	meq	0,075
Zn	meq	0,012
Cu	meq	0,020
B	meq	0,013
Mo	meq	0,011



Conventional  
Fertilizer

*g/Ha/day*

*Absorption  
efficiency\**

N	96.03	326.38	30%
P2O5	4.20	85.33	19%
K2O	17.16	381.94	11%
Ca	16.77	237.21	22%
Mg	4.68	74.47	83%
S	7.76	108.61	
Fe	2.59	4.18	
B	0.04	0.07	
Mo	0.03	0.96	
Zn	0.56	1.29	77%
Cu	0.04	0.75	9%
Mn	1.21	2.99	31%
Co	0.01	0.00	

\*SOURCE: Andrés Fernando Padilla Valverde, Cotopaxi, Ecuador 2017. Nutrient absorption curves of the Rockefeller rose under macrotunnel conditions.





	Daily input in:			330
	A	B	Acids	Unit
SUPER NITRO® (30-0-0)		25.41		L
SULFUR (8-0-0+10s)	0.00			L
PHOS-MAX™ (0-50-0)		1.37		L
SUPER K™ (0-0-40)		7.08		L
CALCIUM (8-0-0+10 Ca)	27.67			L
44 MAG® (0-0-0+5Mg+5.5S)	15.44			L
IRON (12-0-0 +4S+6Fe)	7.12			L
MANGANESE (5Mn+2.5S)	3.53			L
Z MAX® (8ZN+5S+2Mn+0.5Cu)	1.16			L
COPPER (4S + 5%Cu)	0.00			L
BORON (5B)	0.13			L
COMOL (0-5-0+1Co+3Mo)	0.17			L
HNO3	0.00		42.85	L
	55.21	33.86	42.85	

L/Day	89.08
LITERS/MONTH	1781.54



## Conventional Fertilizer

	Daily input in:			330
	A	B	Acids	Unit
Calcium Nitrate 26% CaO	206	0	0	k
Fe-EDDHA 6%	11438	0	0	g
Mn-EDTA 13%	0	3797	0	g
Zn-EDTA 15%	0	1418	0	g
Cu-EDTA 15%	0	825	0	g
Potassium Nitrate 46% K2O	27	110	0	k
Magnesium Sulphate 16% MgO	0	128	0	k
Borax 11.3%	0	105	0	g
Ammonium Molybdate 56.5%	0	293	0	g
Nitric Acid 68%	0.00	0.00	42.9	l
URFOS 44% P2O5 + 17% N	0	32	0	k
	244.44	244.47	59.99	k/l

K/DAY	488.91
KILOGRAMS/MONTH	9778.16

