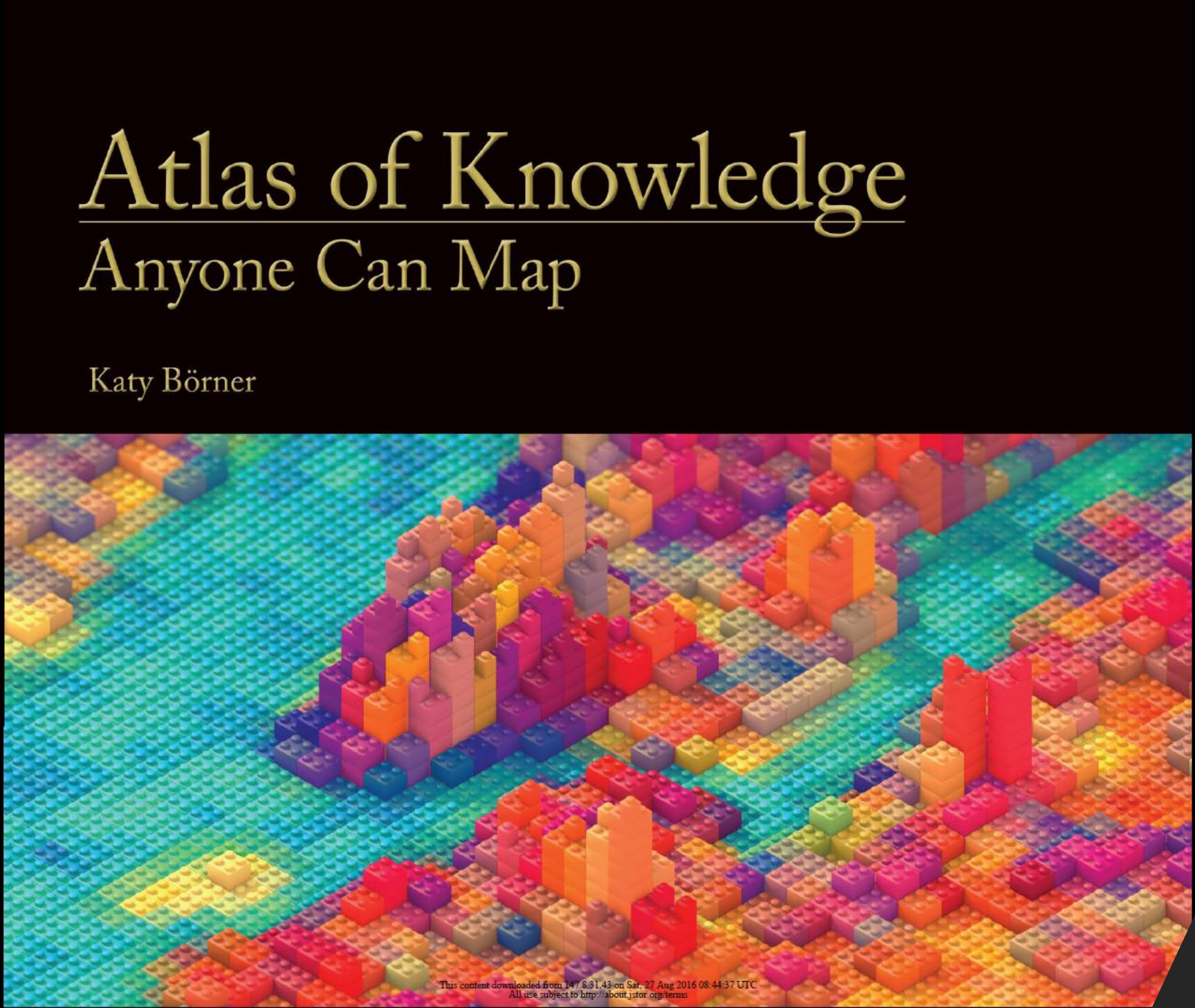
Visualizaciones Científicas

Efrén Romero Riaño



Atlas of Knowledge

Anyone Can Map

Katy Börner

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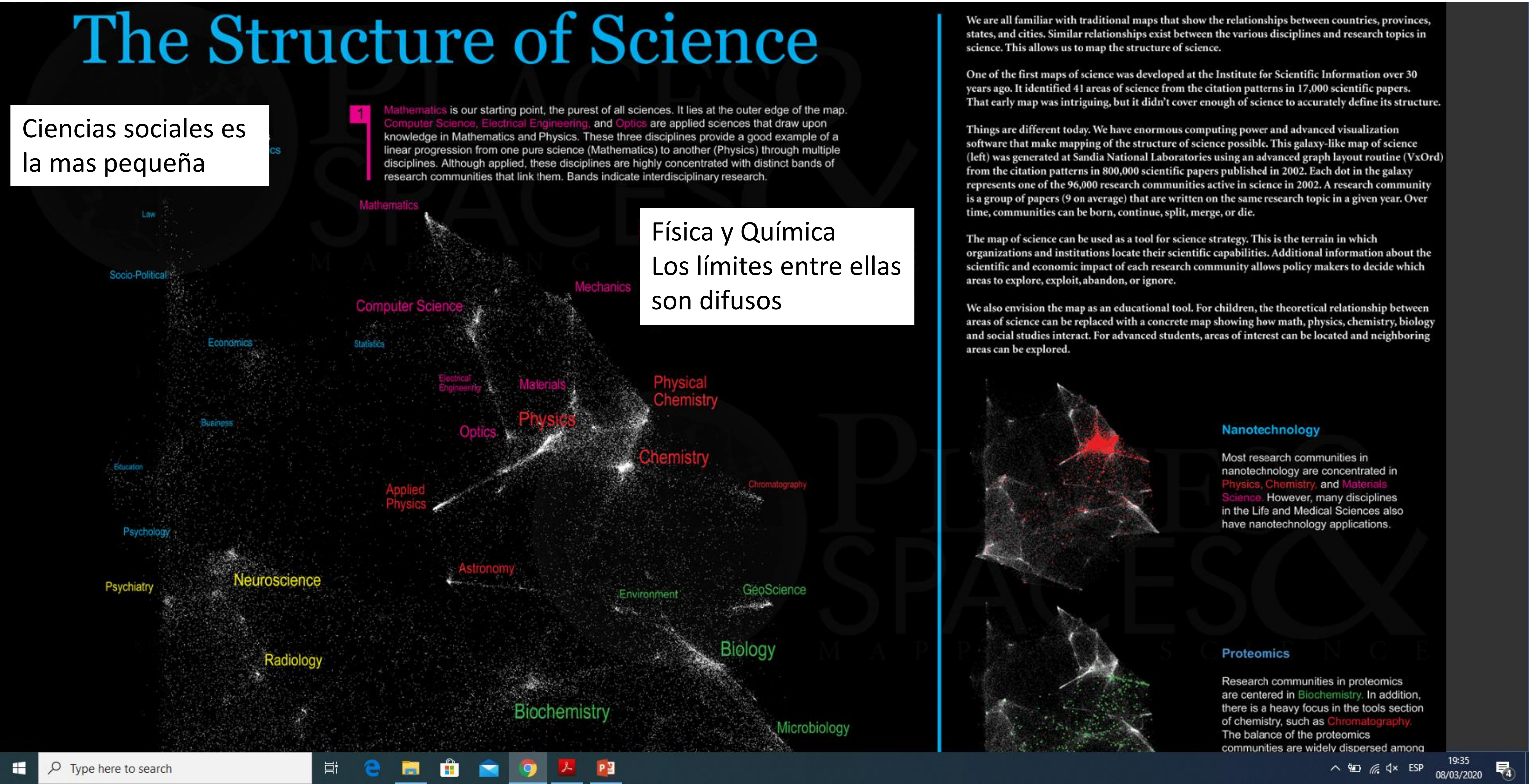
Mapa de “Galaxia”:estructura científica mundial

- Nivel Macro- Tipo red social
- Kevin Boyack
- Creado a partir de patrones de citación de 800.000 artículos científicos
- Cada punto representa una de 96.000 comunidades científicas detectadas



The Structure of Science

Ciencias sociales es la mas pequeña

1 Mathematics is our starting point, the purest of all sciences. It lies at the outer edge of the map. Computer Science, Electrical Engineering, and Optics are applied sciences that draw upon knowledge in Mathematics and Physics. These three disciplines provide a good example of a linear progression from one pure science (Mathematics) to another (Physics) through multiple disciplines. Although applied, these disciplines are highly concentrated with distinct bands of research communities that link them. Bands indicate interdisciplinary research.

Física y Química
Los límites entre ellas son difusos

Mathematics
Law
Socio-Political
Mechanics
Computer Science
Economics
Statistics
Electrical Engineering
Materials
Physical Chemistry
Business
Physics
Optics
Chemistry
Education
Chromatography
Applied Physics
Psychology
Astronomy
Psychiatry
Neuroscience
Environment
GeoScience
Biology
Radiology
Biochemistry
Microbiology

We are all familiar with traditional maps that show the relationships between countries, provinces, states, and cities. Similar relationships exist between the various disciplines and research topics in science. This allows us to map the structure of science.

One of the first maps of science was developed at the Institute for Scientific Information over 30 years ago. It identified 41 areas of science from the citation patterns in 17,000 scientific papers. That early map was intriguing, but it didn't cover enough of science to accurately define its structure.

Things are different today. We have enormous computing power and advanced visualization software that make mapping of the structure of science possible. This galaxy-like map of science (left) was generated at Sandia National Laboratories using an advanced graph layout routine (VxOrd) from the citation patterns in 800,000 scientific papers published in 2002. Each dot in the galaxy represents one of the 96,000 research communities active in science in 2002. A research community is a group of papers (9 on average) that are written on the same research topic in a given year. Over time, communities can be born, continue, split, merge, or die.

The map of science can be used as a tool for science strategy. This is the terrain in which organizations and institutions locate their scientific capabilities. Additional information about the scientific and economic impact of each research community allows policy makers to decide which areas to explore, exploit, abandon, or ignore.

We also envision the map as an educational tool. For children, the theoretical relationship between areas of science can be replaced with a concrete map showing how math, physics, chemistry, biology and social studies interact. For advanced students, areas of interest can be located and neighboring areas can be explored.

Nanotechnology

Most research communities in nanotechnology are concentrated in Physics, Chemistry, and Materials Science. However, many disciplines in the Life and Medical Sciences also have nanotechnology applications.

Proteomics

Research communities in proteomics are centered in Biochemistry. In addition, there is a heavy focus in the tools section of chemistry, such as Chromatography. The balance of the proteomics communities are widely dispersed among

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ESP
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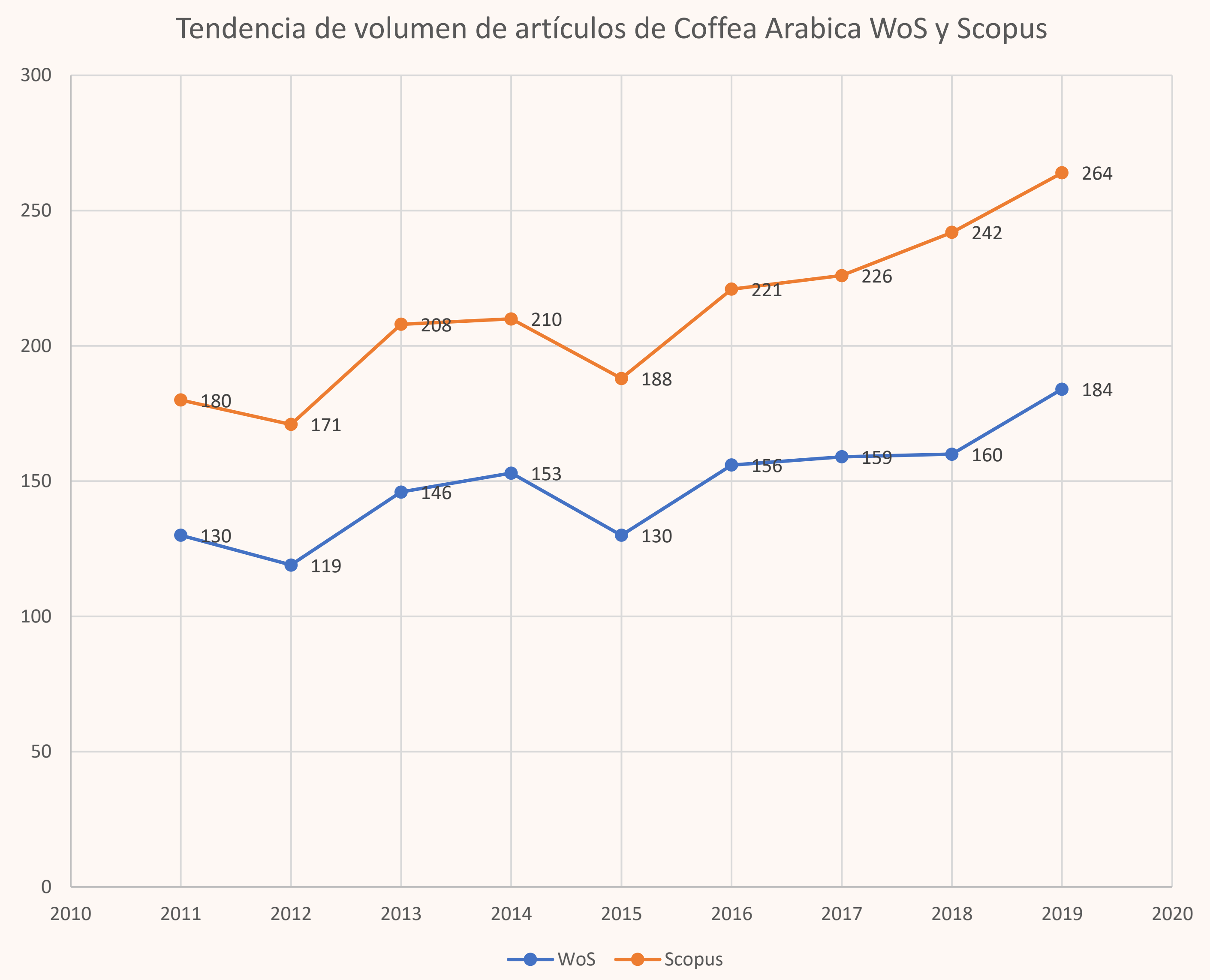
Colaboración científica entre ciudades del mundo

- Oliver H Beauchesne
- Flujo localizado de investigación a partir de Elsevier Scopus (4.000.000 de registros).
- Se construye a partir de la distancia geodésica (distancia mas corta) entre el origen geográfico de autores de artículos.

MAPPING SCIENCE

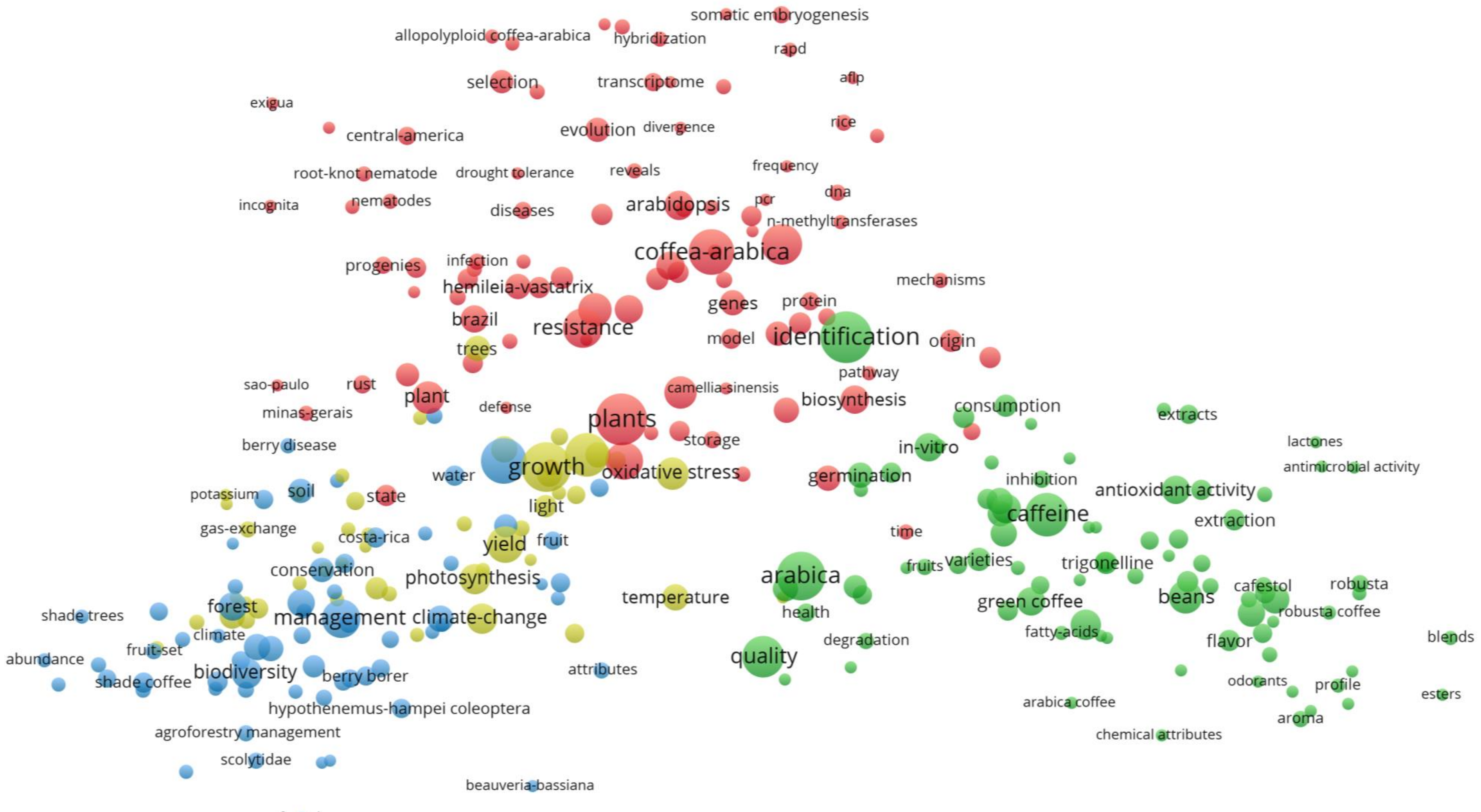
Comparativo entre WoS y Scopus “coffea arabica”



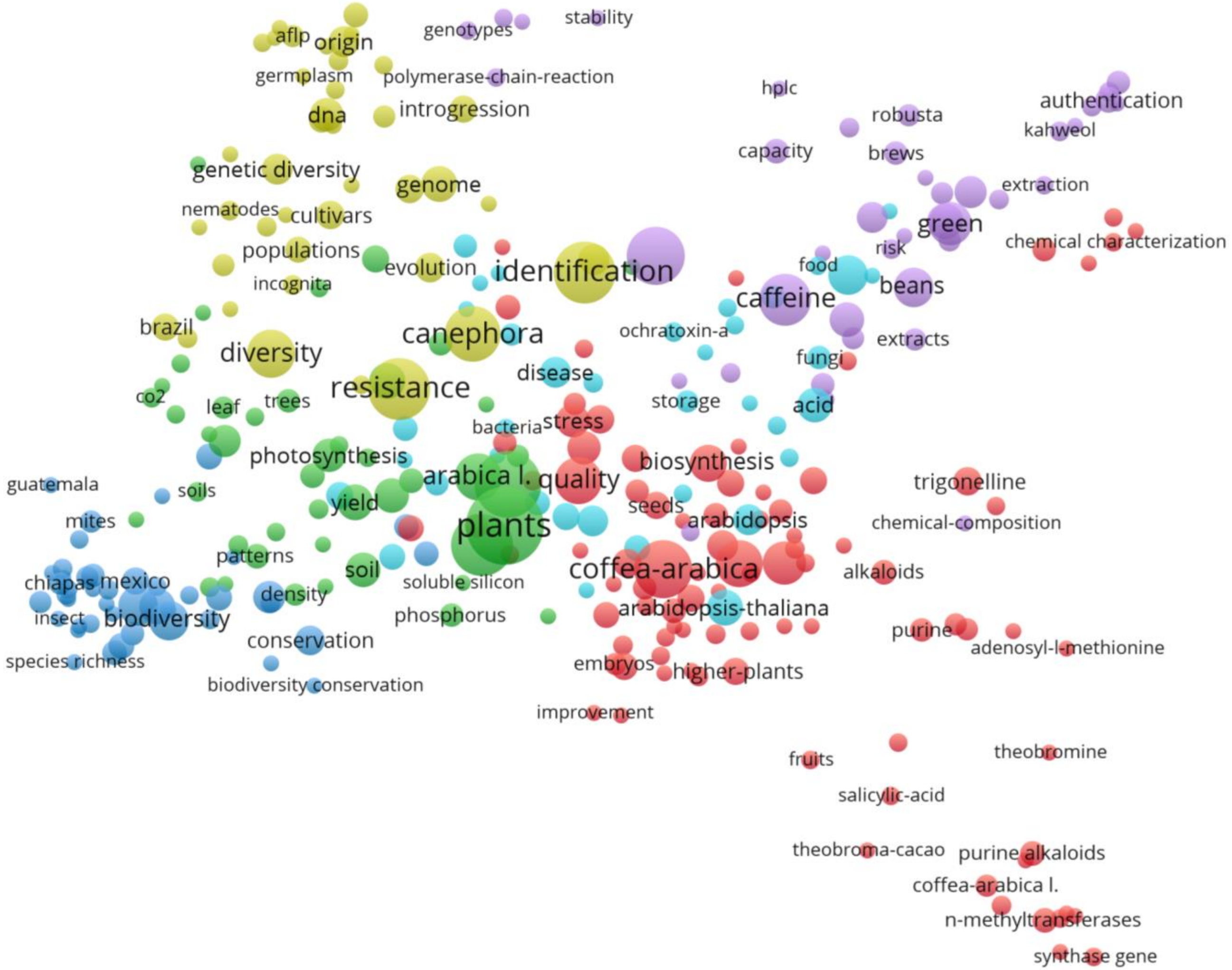
2000 artículos WoS

- Nivel Meso (2000)
- Tipo: Red Social
- Mapa de Tópicos
- ¿Cuáles son los frentes de investigación dentro WoS?
- ¿En que cuadrante de esta panorama mundial se ubica la producción de CENICAFÉ?

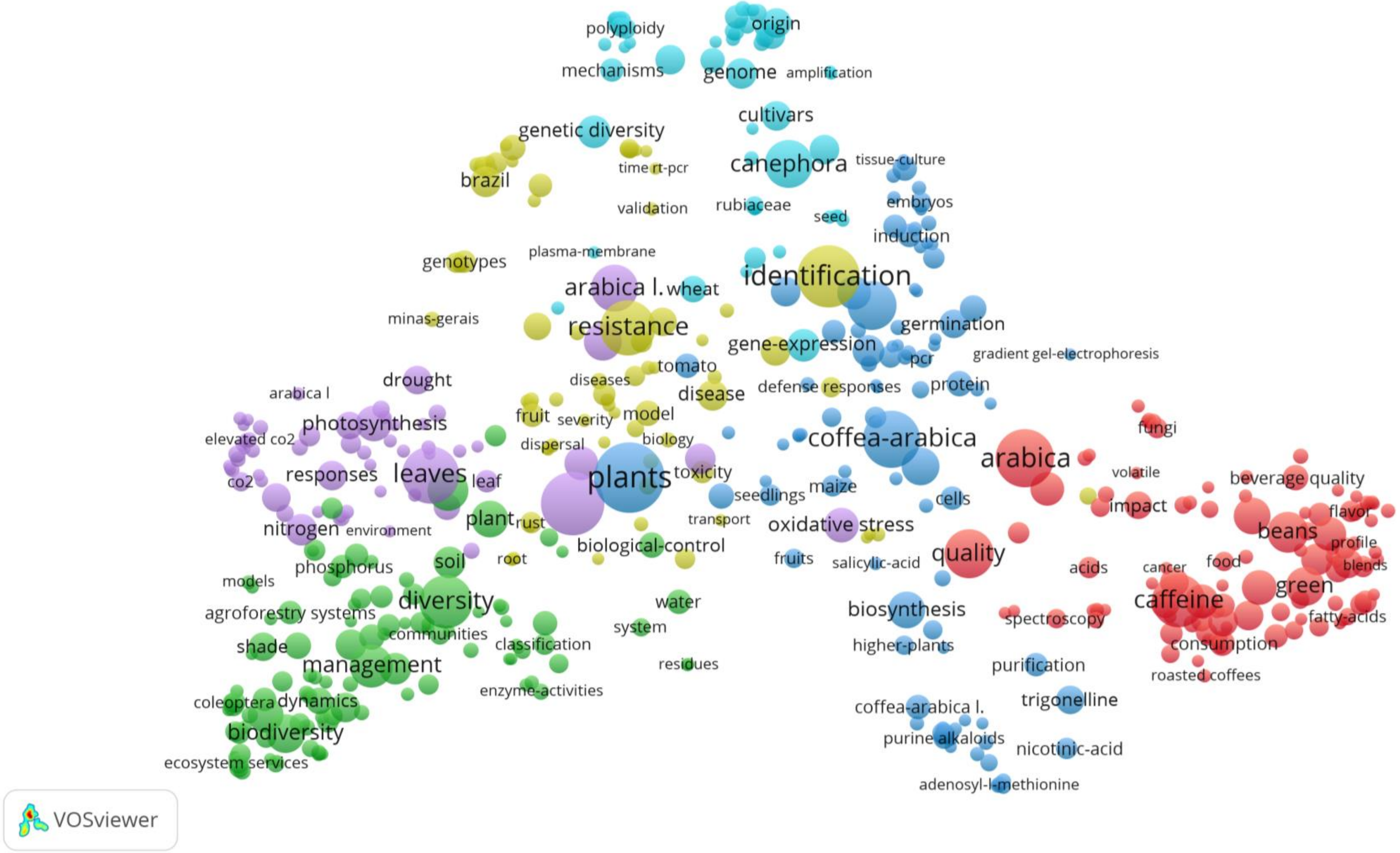
Tópicos de investigación WoS 2015-2019



Tópicos de investigación WoS 2010-2014



WoS 2010-2019 “Coffea arabica”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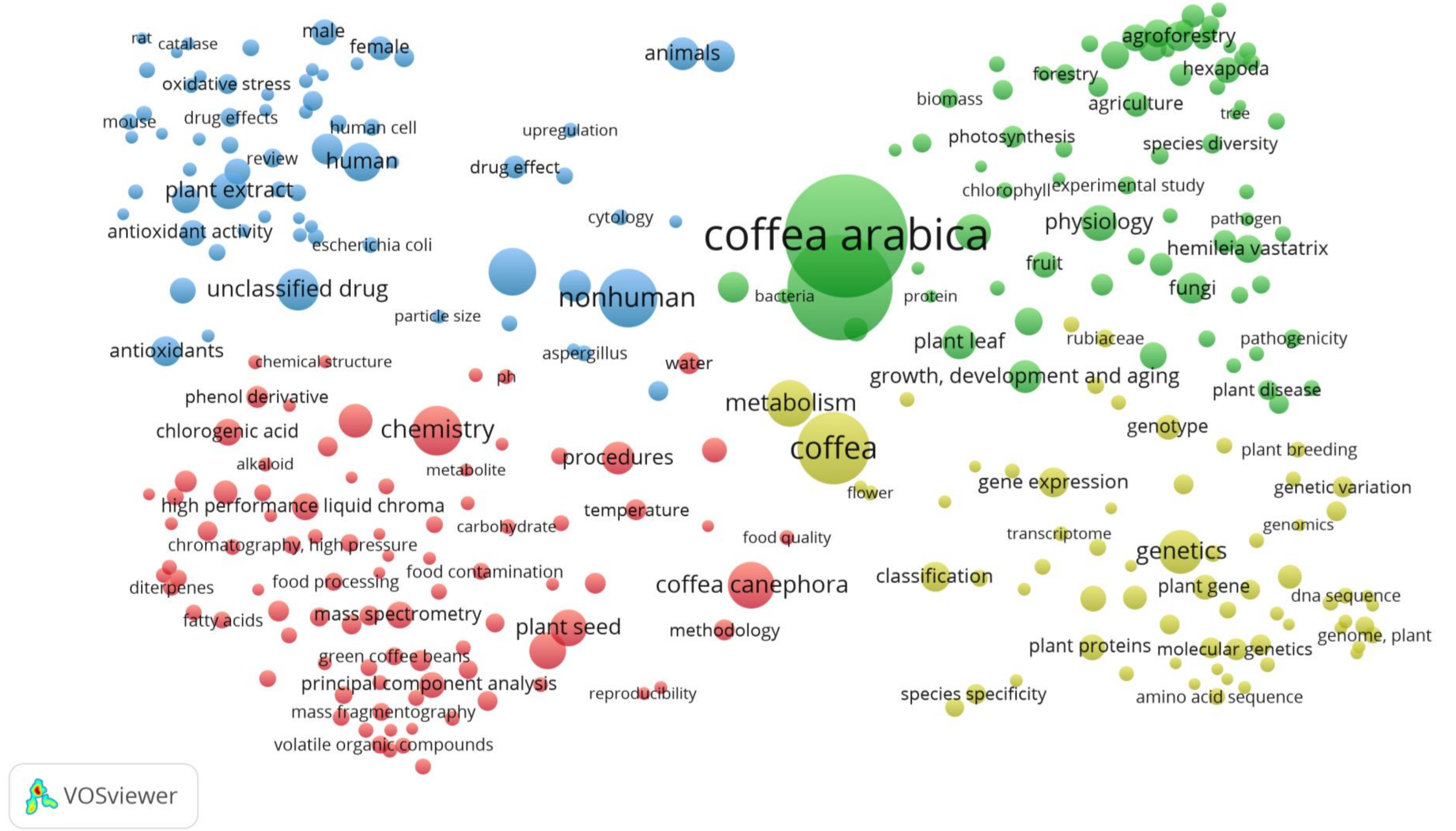
origin
mechanisms
genome
amplification
cultivars
genetic diversity
time
rt-pcr
canephora
tissue-culture
brazil
validation
rubiaceae
seed
embryos
induction
genotypes
plasma-membrane
arabica l.
wheat
identification
minas-gerais
resistance
germination
gene-expression
pcr
gradient gel-electrophoresis
drought
diseases
tomato
disease
defense responses
protein
arabica l
photosynthesis
fruit
severity
model
fungi
elevated co2
dispersal
biology
coffea-arabica
arabica
responses
leaves
leaf
plants
toxicity
volatile
co2
seedlings
maize
cells
beverage quality
impact
flavor
nitrogen
environment
plant
rust
transport
oxidative stress
beans
profile
biological-control
blends
phosphorus
soil
root
fruits
salicylic-acid
quality
acids
cancer
food
green
models
diversity
water
caffeine
agroforestry systems
system
biosynthesis
spectroscopy
fatty-acids
communities
shade
classification
higher-plants
consumption
management
residues
purification
roasted coffees
enzyme-activities
coleoptera
dynamics
trigonelline
coffea-arabica l.
biodiversity
purine alkaloids
nicotinic-acid
ecosystem services
adenosyl-l-methionine
VOSviewer

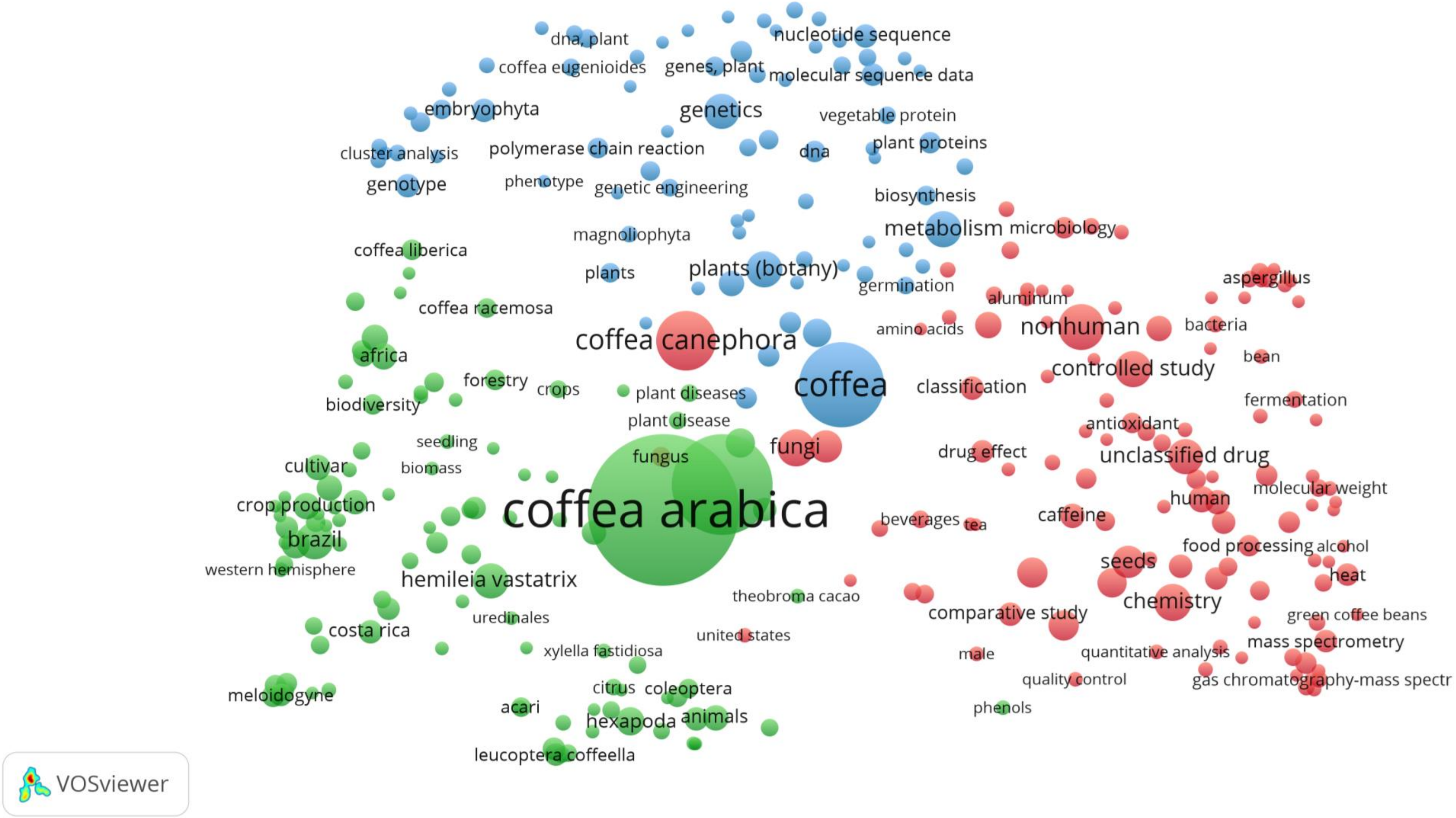
4000 artículos Scopus

- Nivel Meso (4000)
- Tipo: Red Social
- Mapa de Tópicos
- ¿Cuáles son los frentes de investigación dentro de Scopus?
- ¿En que cuadrante de esta panorama mundial se ubica la producción de CENICAFÉ?

Scopus 2014-2019



Scopus 2008-2013


nucleotide sequence
dna, plant
coffea eugenioides
genes, plant
molecular sequence data
embryophyta
genetics
vegetable protein
cluster analysis
polymerase chain reaction
dna
plant proteins
genotype
phenotype
genetic engineering
biosynthesis
metabolism
microbiology
magnoliophyta
coffea liberica
plants
plants (botany)
germination
aspergillus
aluminum
coffea racemosa
amino acids
nonhuman
bacteria
coffea canephora
bean
africa
controlled study
coffea
classification
forestry
crops
plant diseases
fermentation
biodiversity
plant disease
antioxidant
seedling
fungi
drug effect
unclassified drug
fungus
cultivar
biomass
molecular weight
human
crop production
coffea arabica
caffeine
beverages
tea
brazil
food processing
alcohol
western hemisphere
seeds
hemileia vastatrix
heat
theobroma cacao
chemistry
uredinales
comparative study
green coffee beans
costa rica
united states
mass spectrometry
xylella fastidiosa
male
quantitative analysis
quality control
gas chromatography-mass spectr
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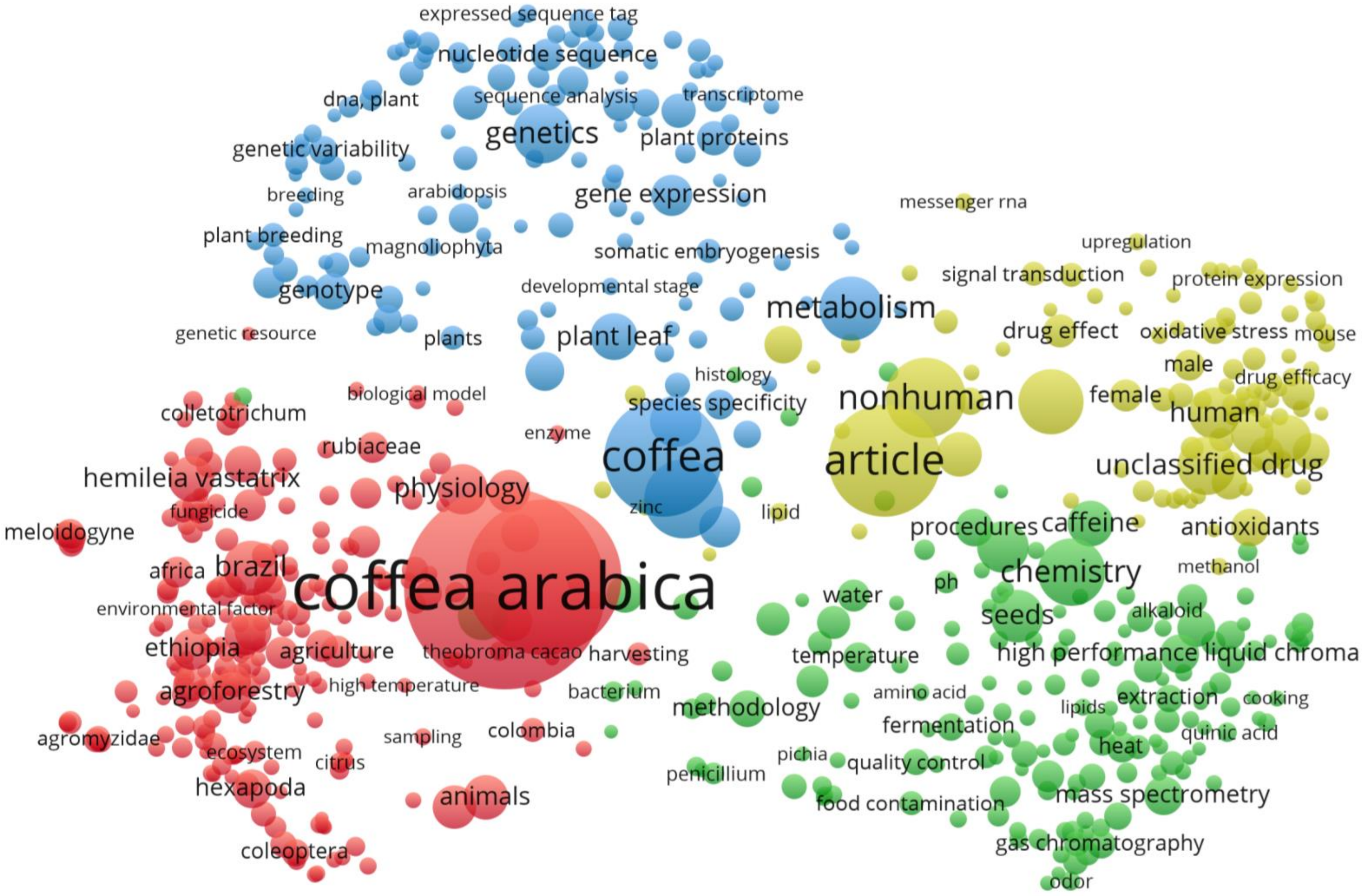
coleoptera
meloidogyne
acari
phenols
hexapoda
animals
leucoptera coffeella
VOSviewer

Scopus 2008-2019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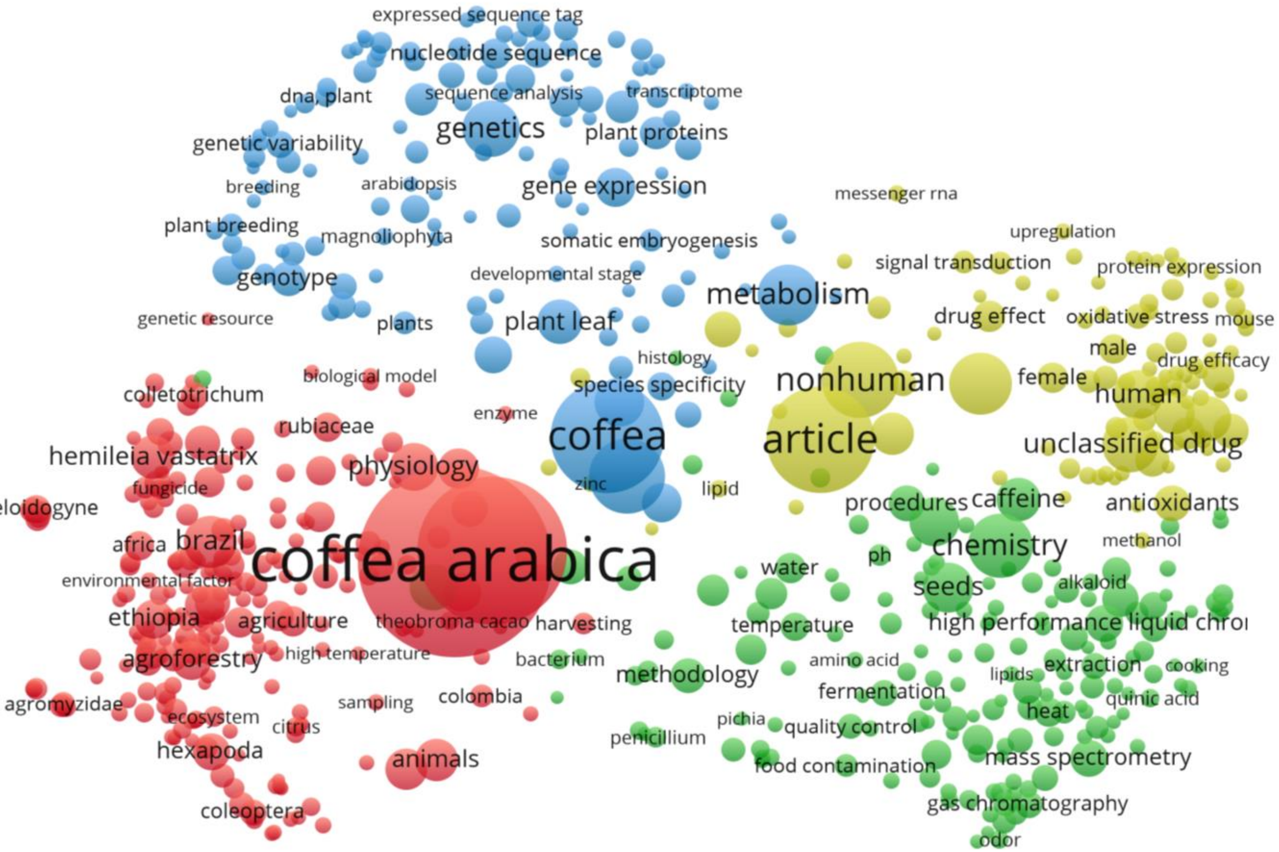
nucleotide sequence
dna, plant
sequence analysis
transcriptome
genetic variability
genetics
plant proteins
breeding
arabidopsis
gene expression
messenger rna
plant breeding
magnoliophyta
somatic embryogenesis
upregulation
signal transduction
protein expression
genotype
developmental stage
metabolism
genetic resource
plants
plant leaf
drug effect
oxidative stress
mouse
male
drug efficacy
histology
biological model
colletotrichum
species specificity
nonhuman
female
human
enzyme
rubiaceae
coffea
article
unclassified drug
hemileia vastatrix
physiology
fungicide
zinc
lipid
procedures
caffeine
antioxidants
meloidogyne
methanol
africa
brazil
chemistry
coffea arabica
ph
water
environmental factor
seeds
alkaloid
ethiopia
agriculture
theobroma cacao
harvesting
temperature
high performance liquid chroma
agroforestry
high temperature
bacterium
amino acid
methodology
extraction
cooking
lipids
fermentation
agromyzidae
colombia
heat
quinic acid
ecosystem
sampling
citrus
pichia
quality control
penicillium
hexapoda
animals
mass spectrometry
food contamination
coleoptera
gas chromatography
odor

- Nivel Meso (2000-4000)
- Tipo: Red Social
- Mapa de Tópicos
- ¿Qué diferencias y coincidencias existen en la producción científica entre ambas bases de datos?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breeding
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gene expression
messenger rna
plant breeding
magnoliophyta
somatic embryogenesis
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environmental factor
water
seeds
alkaloid
ethiopia
agriculture
theobroma cacao
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high performance liquid chro
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bacterium
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extraction
cooking
methodology
lipids
fermentation
agromyzidae
ecosystem
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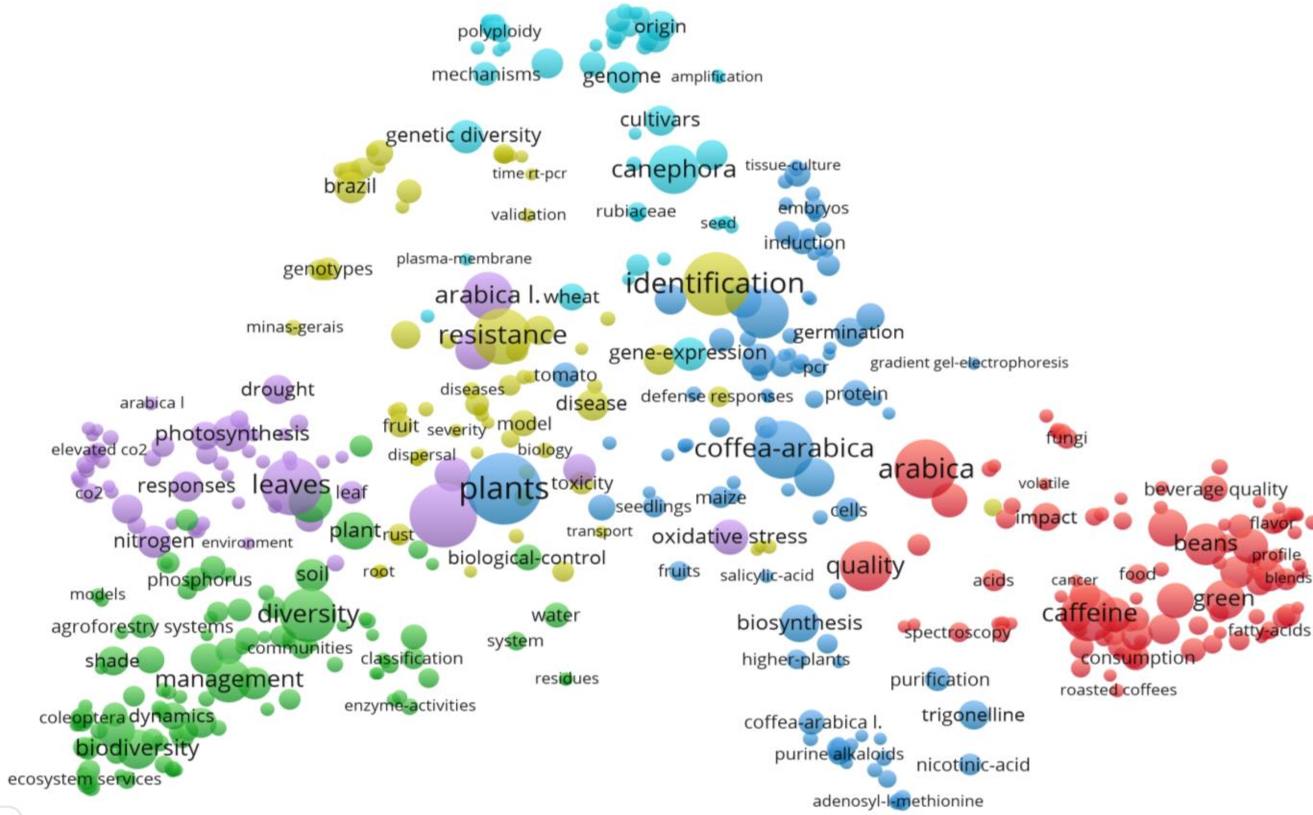
mass spectrometry
coleoptera
gas chromatography
odor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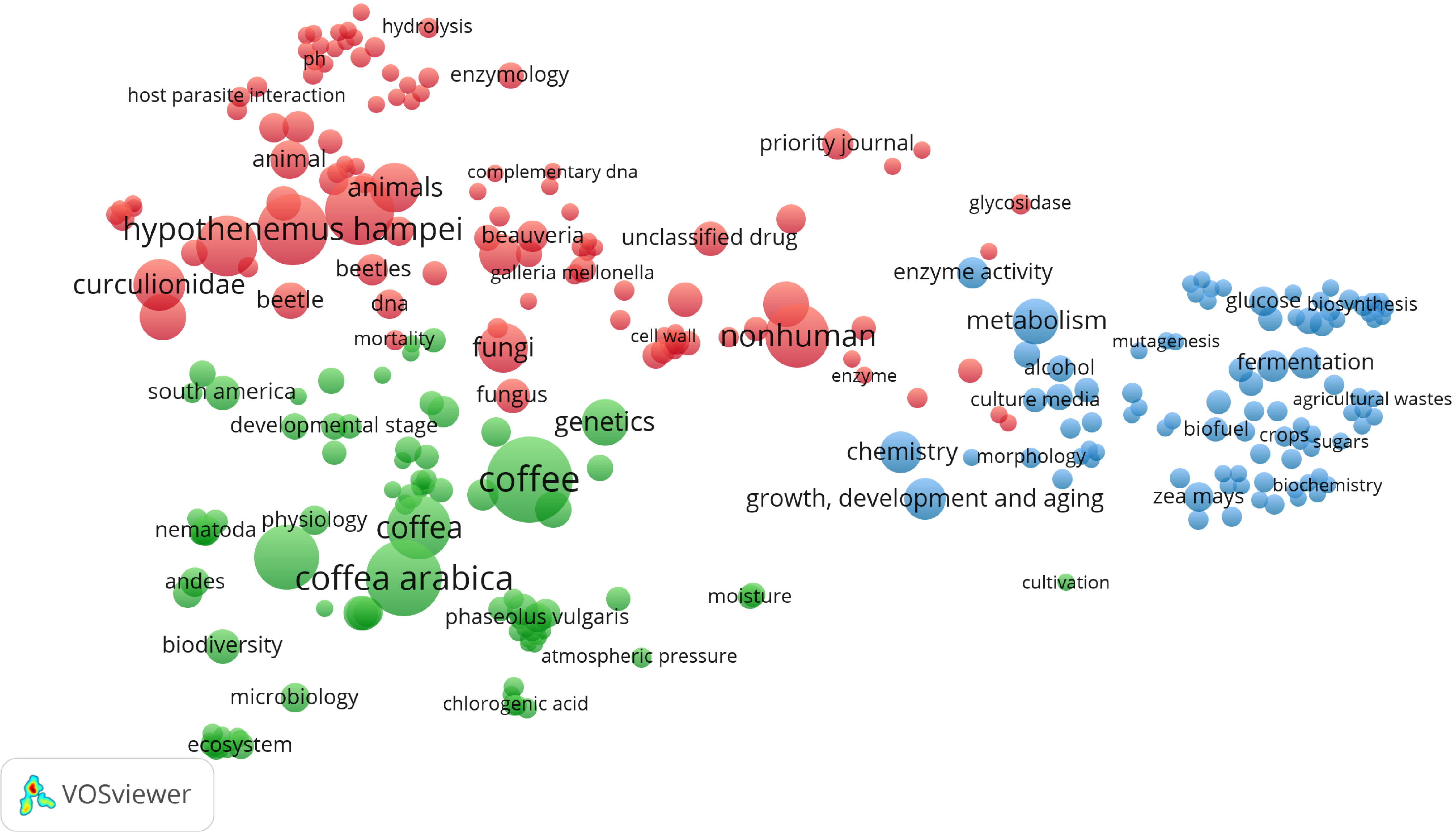
origin
mechanisms
genome
amplification
cultivars
genetic diversity
time rt-pcr
canephora
tissue-culture
brazil
validation
rubiaceae
seed
embryos
induction
genotypes
plasma-membrane
identification
arabica l.
wheat
minas-gerais
resistance
germination
gene-expression
pcr
gradient gel-electrophoresis
drought
tomato
diseases
disease
defense responses
protein
arabica l
photosynthesis
fruit
severity
model
fungi
elevated co2
dispersal
biology
coffea-arabica
arabica
volatile
responses
leaves
plants
toxicity
beverage quality
co2
leaf
seedlings
maize
cells
impact
flavor
transport
oxidative stress
beans
plant
rust
nitrogen
environment
profile
biological-control
quality
fruits
salicylic-acid
acids
cancer
food
blends
root
phosphorus
soil
models
green
diversity
biosynthesis
caffeine
agroforestry systems
communities
spectroscopy
fatty-acids
water
shade
classification
higher-plants
system
consumption
management
purification
residues
roasted coffees
enzyme-activities
coleoptera
dynamics
trigonelline
coffea-arabica l.
biodiversity
purine alkaloids
nicotinic-acid
ecosystem services
adenosyl-l-methionine

204 artículos en Scopus

- Nivel Micro
- Tipo: Red Social
- Mapa de Tópicos
- ¿Qué frentes de investigación refleja el contenido de artículos de CENICAFÉ dentro de Scopus?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enzymology
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animal
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priority journal
glycosidase
hypothenemus hampei
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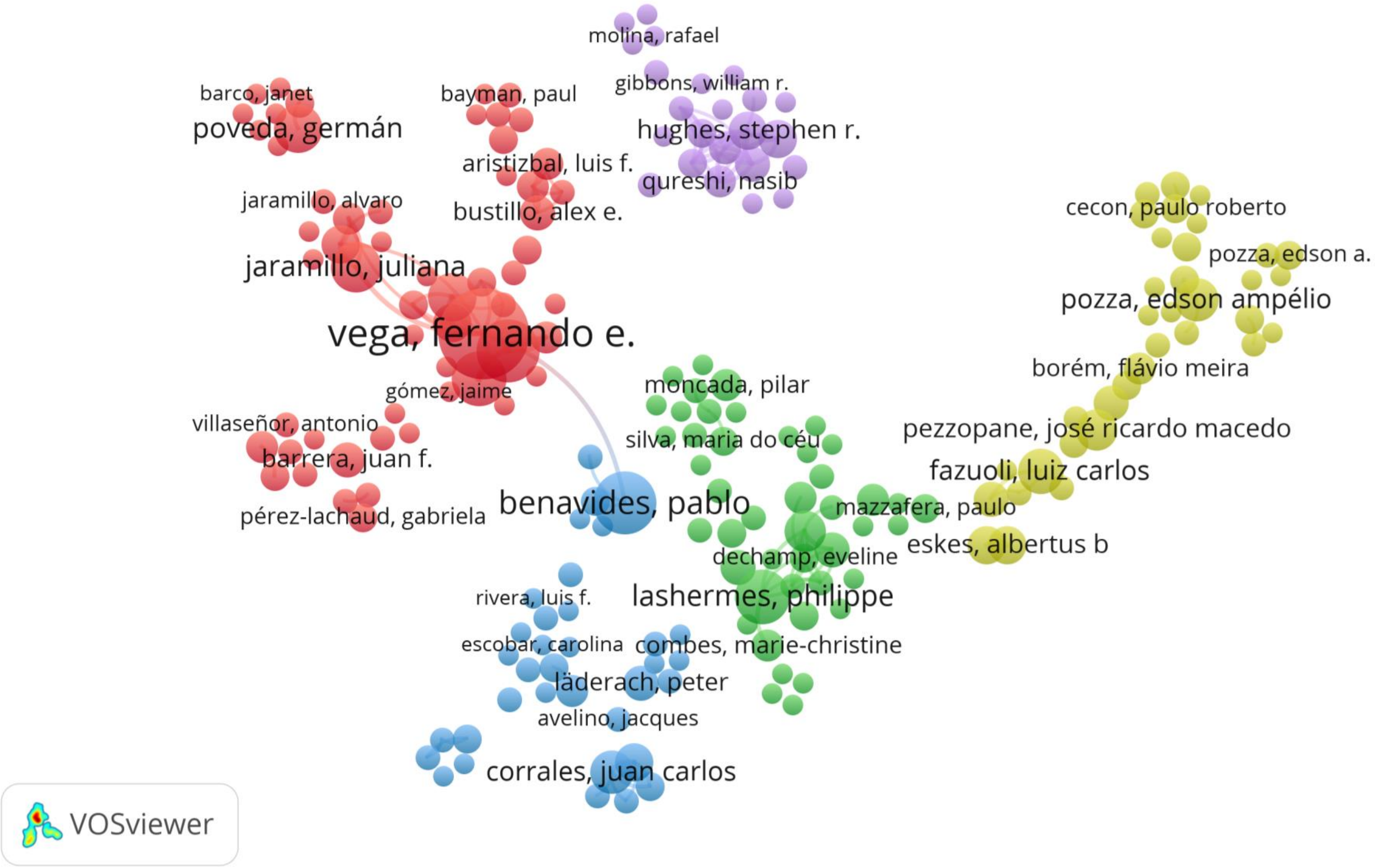
unclassified drug
curculionidae
beetles
galleria mellonella
enzyme activity
beetle
dna
glucose
biosynthesis
metabolism
mortality
fungi
cell wall
nonhuman
mutagenesis
fermentation
alcohol
enzyme
south america
fungus
culture media
agricultural wastes
developmental stage
genetics
biofuel
crops
sugars
chemistry
morphology
coffee
growth, development and aging
biochemistry
zea mays
nematoda
physiology
coffea
andes
coffea arabica
cultivation
moisture
phaseolus vulgaris
biodiversity
atmospheric pressure
microbiology
chlorogenic acid
ecosystem
VOSviewer

Zona de Acceso abierto Colaboración Científica

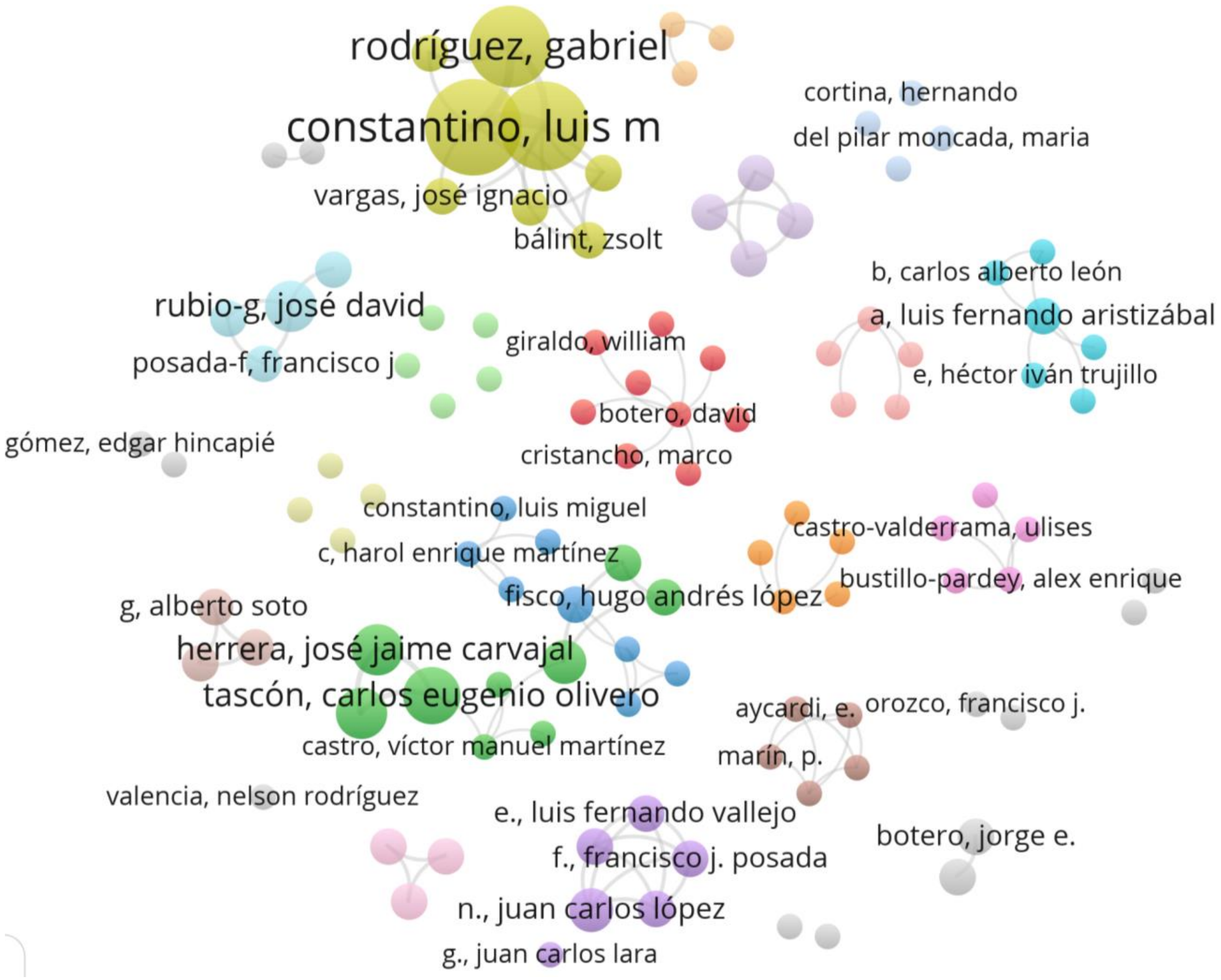
2017 documentos en Dimensions

- Nivel Meso
- Tipo: Red Social
- Mapa de colaboración (Con quienes?)

Colaboración Dimensions-Altmetrics


molina, rafael
barco, janet
bayman, paul
gibbons, william r.
poveda, germán
hughes, stephen r.
aristizbal, luis f.
qureshi, nasib
jaramillo, alvaro
bustillo, alex e.
cecon, paulo roberto
pozza, edson a.
jaramillo, juliana
pozza, edson ampélio
vega, fernando e.
borém, flávio meira
moncada, pilar
gómez, jaime
villaseñor, antonio
pezzopane, josé ricardo macedo
silva, maria do céu
barrera, juan f.
fazuoli, luiz carlos
benavides, pablo
mazzafera, paulo
pérez-lachaud, gabriela
eskes, albertus b
dechamp, eveline
rivera, luis f.
lashermes, philippe
escobar, carolina
combes, marie-christine
läderach, peter
avelino, jacques
corrales, juan carlos
VOSviewer

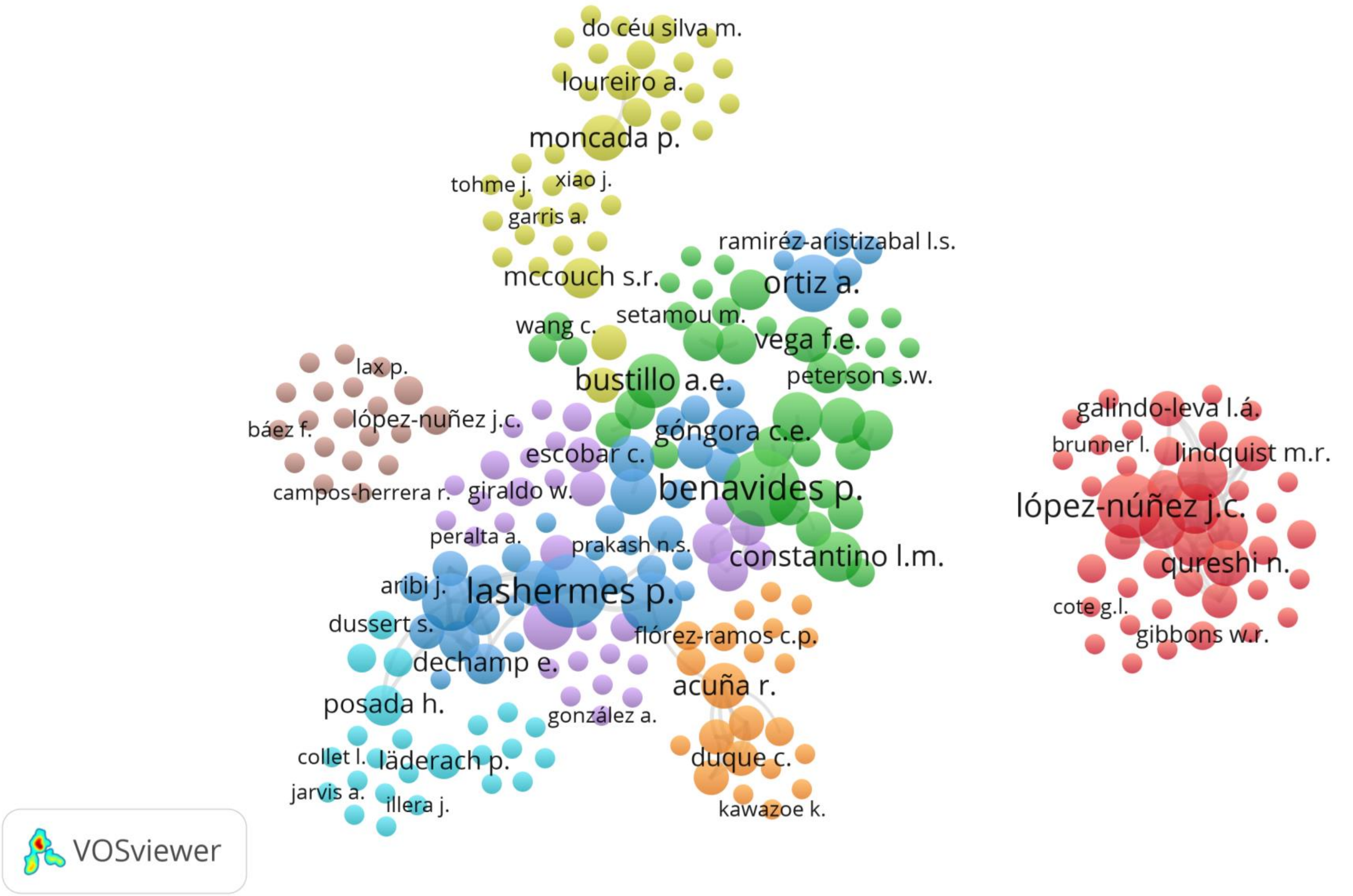
Colaboración Lens (55 documentos)

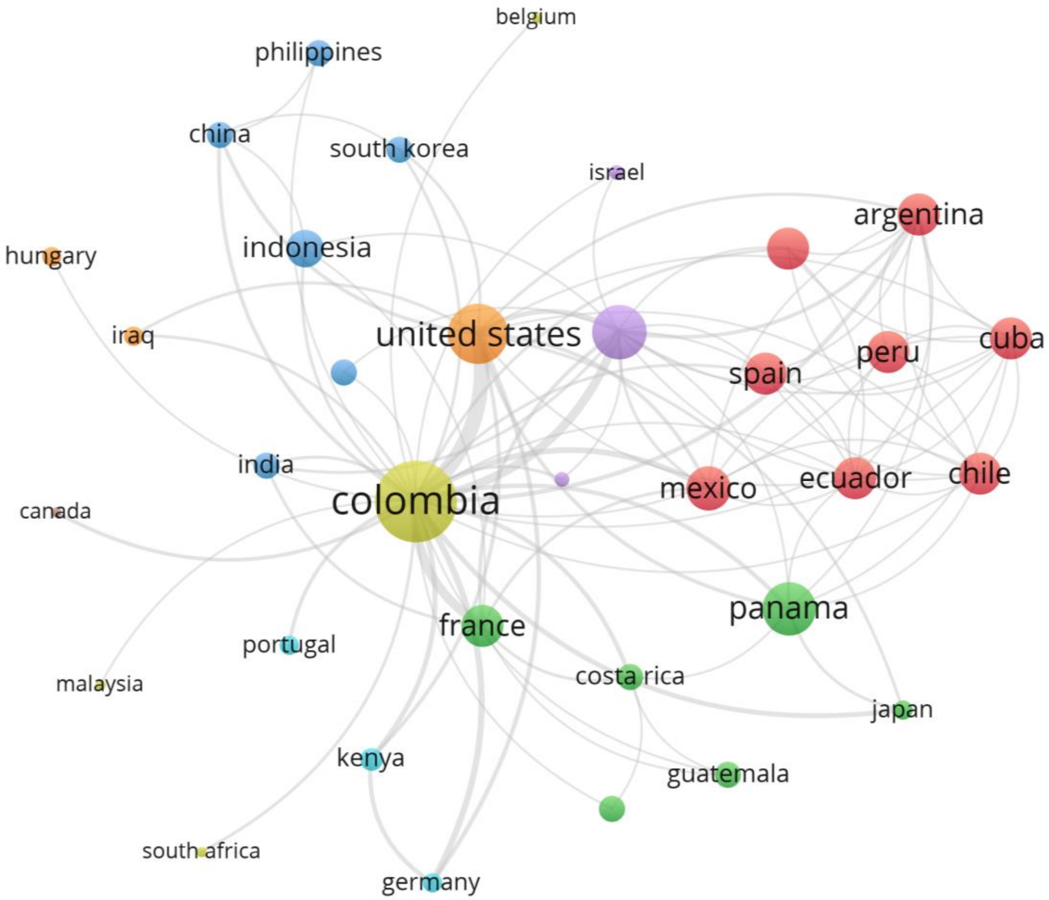

rodríguez, gabriel
constantino, luis m
vargas, josé ignacio
bálint, zsolt
cortina, hernando
del pilar moncada, maria
rubio-g, josé david
posada-f, francisco j
giraldo, william
b, carlos alberto león
a, luis fernando aristizábal
e, héctor iván trujillo
botero, david
cristancho, marco
gómez, edgar hincapié
constantino, luis miguel
c, harol enrique martínez
castro-valderrama, ulises
bustillo-pardey, alex enrique
fisco, hugo andrés lópez
g, alberto soto
herrera, josé jaime carvajal
tascón, carlos eugenio olivero
aycardi, e.
orozco, francisco j.
castro, víctor manuel martínez
marín, p.
valencia, nelson rodríguez
e., luis fernando vallejo
botero, jorge e.
f., francisco j. posada
n., juan carlos lópez
g., juan carlos lara

204 documentos en Scopus

- Nivel Meso
- Tipo: Red Social
- Mapa de colaboración (Con quienes?)

Colaboración Scopus


do céu silva m.
loureiro a.
moncada p.
tohme j.
xiao j.
garris a.
mccouch s.r.
ramiréz-aristizabal l.s.
ortiz a.
wang c.
setamou m.
vega f.e.
lax p.
bustillo a.e.
peterson s.w.
báez f.
lópez-nuñez j.c.
góngora c.e.
escobar c.
galindo-leva l.á.
brunner l.
lindquist m.r.
campos-herrera r.
giraldo w.
benavides p.
lópez-núñez j.c.
peralta a.
prakash n.s.
constantino l.m.
qureshi n.
aribi j.
lashermes p.
cote g.l.
dussert s.
flórez-ramos c.p.
gibbons w.r.
dechamp e.
acuña r.
posada h.
gonzález a.
collet l.
läderach p.
duque c.
jarvis a.
illera j.
kawazoe k.
VOSviewer


belgium
philippines
china
south korea
israel
argentina
hungary
indonesia
united states
iraq
cuba
peru
spain
india
colombia
mexico
ecuador
chile
canada
panama
france
portugal
costa rica
malaysia
japan
kenya
guatemala
south africa
germany

polyploidy
origin
mechanisms
genome
amplification
cultivars
genetic diversity
brazil
time rt-pcr
canephora
tissue-culture
validation
rubiaceae
seed
embryos
induction
genotypes
plasma-membrane
arabica l.
wheat
identification
minas-gerais
resistance
germination
gene-expression
pcr
gradient gel-electrophoresis
tomato
drought
diseases
disease
defense responses
protein
arabica l
photosynthesis
fruit
severity
model
elevated co2
dispersal
biology
coffea-arabica
fungi
arabica
volatile
responses
leaves
leaf
plants
toxicity
beverage quality
co2
seedlings
maize
cells
impact
flavor
plant
rust
transport
oxidative stress
beans
nitrogen
environment
profile
polysaccharides
biological-control
fruits
salicylic-acid
quality
blends
phosphorus
soil
root
acids
cancer
food
green
models
diversity
water
caffeine
agroforestry systems
biosynthesis
spectroscopy
fatty-acids
communities
system
shade
classification
higher-plants
consumption
management
residues
purification
roasted coffees
enzyme-activities
coleoptera
dynamics
trigonelline
coffea-arabica l.
biodiversity
purine alkaloids
nicotinic-acid
ecosystem services
adenosyl-l-methionine
VOSviewer