

SAI SEMPRE QUALE PESCE STAI MANGIANDO?

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ISTITUTO
ITALIANO DI
TECNOLOGIA



CHI SEI ?



Acceptable Market Name(s)	Common Name	Scientific Name (sorted A-Z)
Sturgeon	Siberian Sturgeon	<i>Acipenser baerii</i>
Sturgeon	Yangtze Sturgeon	<i>Acipenser dabryanus</i>
Sturgeon	Lake Sturgeon	<i>Acipenser fulvescens</i>
Sturgeon	Russian Sturgeon	<i>Acipenser gueldenstaedtii</i>
Sturgeon	Green Sturgeon	<i>Acipenser medirostris</i>
Sturgeon	Japanese Sturgeon	<i>Acipenser multiscutatus</i>
Sturgeon	Thorn Sturgeon	<i>Acipenser nudiventris</i>
Sturgeon	Atlantic Sturgeon	<i>Acipenser oxyrinchus</i>
Sturgeon	Sterlet	<i>Acipenser ruthenus</i>
Sturgeon	Amur Sturgeon	<i>Acipenser schrenckii</i>
Sturgeon	Stellate Sturgeon	<i>Acipenser stellatus</i>
Sturgeon	White Sturgeon	<i>Acipenser transmontanus</i>

**MA A VOLTE AL POSTO DELLO STORIONE
TI TROVI UN BEL FILETTO DI PANGASIO**

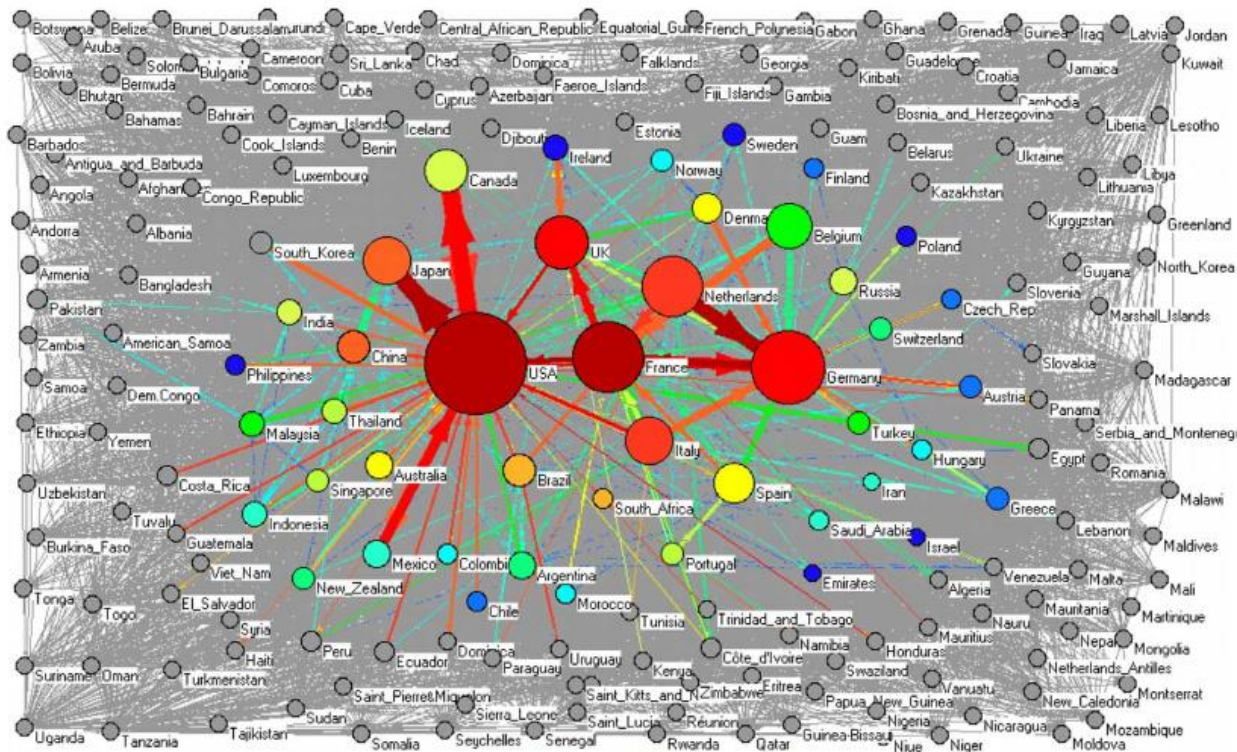




I NUMERI SONO IMPORTANTI !

Fish fillet samples	Mislabeling (%)	VU (Vulnerable)	EN (Endangered)	CR (Critically Endangered)
CERNIA	85.7	-	12/56 (21,4%)	-
PERSICO	100	-	36/64 (56,25%)	4/64 (6,25%)
PESCE SPADA	65	28/80 (35%)	-	

SUL MERCATO EUROPEO ARRIVANO OLTRE 1200 SPECIE DA TUTTO IL MONDO. ITALIA, FRANCIA E SPAGNA ASSOBBONO IL 60%



Reg. EC 852/04, Reg. EC 853/04, Reg. EC 1379/13, Reg. EC 1420/13).



- **FALSIFICAZIONE COLPISCE L'INTERA CATENA ALIMENTARE**
- **PERSICO, CERNIA, SOGLIOLA E ALTRI PESCI PREGIATI VENGONO FRODATI PREVALENTEMENTE CON IL PESCE GATTO ASIATICO (PANGASIO)**
- **IN CIRCA DUE TERZI DEGLI STUDI, LA FRODE È INTENZIONALE ED È MOTIVATA DAL GUADAGNO ECONOMICO**
- **IN OLTRE IL 50% VI SONO RISCHI PER LA SALUTE: ALLERGIE, PROBLEMI GASTROINTESTINALI, ECC...**

DNA BARCODING



THE ROYAL
SOCIETY

FirstCite®
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Published online

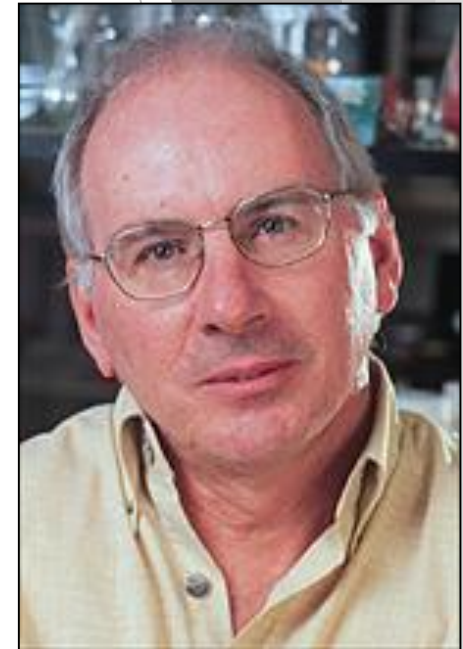
Biological identifications through DNA barcodes

Paul D. N. Hebert*, Alina Cywinska, Shelley L. Ball
and Jeremy R. deWaard

Department of Zoology, University of Guelph, Guelph, Ontario N1G 2W1, Canada

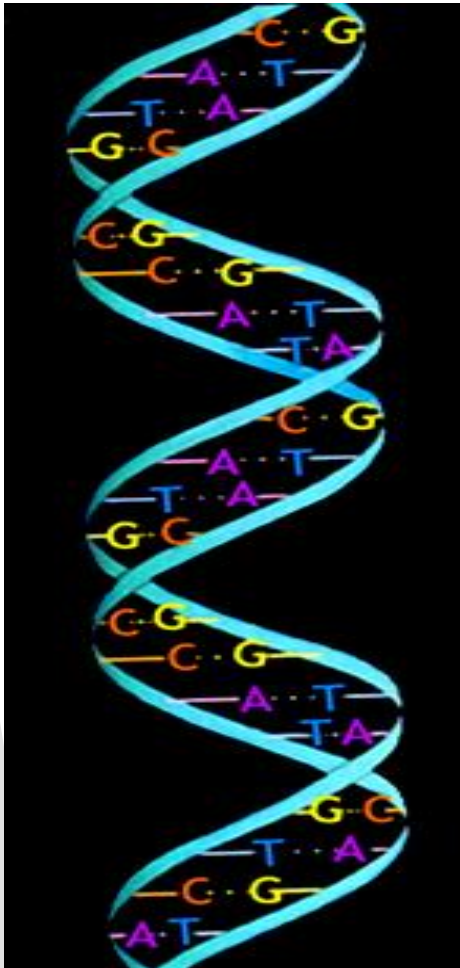
Although much biological research depends upon species diagnoses, taxonomic expertise is collapsing. We are convinced that the sole prospect for a sustainable identification capability lies in the construction of systems that employ DNA sequences as taxon 'barcodes'. We establish that the mitochondrial gene cytochrome *c* oxidase I (COI) can serve as the core of a global bioidentification system for animals. First, we demonstrate that COI profiles, derived from the low-density sampling of higher taxonomic categories, ordinarily assign newly analysed taxa to the appropriate phylum or order. Second, we demonstrate that species-level assignments can be obtained by creating comprehensive COI profiles. A model COI profile, based upon the analysis of a single individual from each of 200 closely allied species of lepidopterans, was 100% successful in correctly identifying subsequent specimens. When fully developed, a COI identification system will provide a reliable, cost-effective and accessible solution to the current problem of species identification. Its assembly will also generate important new insights into the diversification of life and the rules of molecular evolution.

Keywords: molecular taxonomy; mitochondrial DNA; animals; insects; sequence diversity; evolution

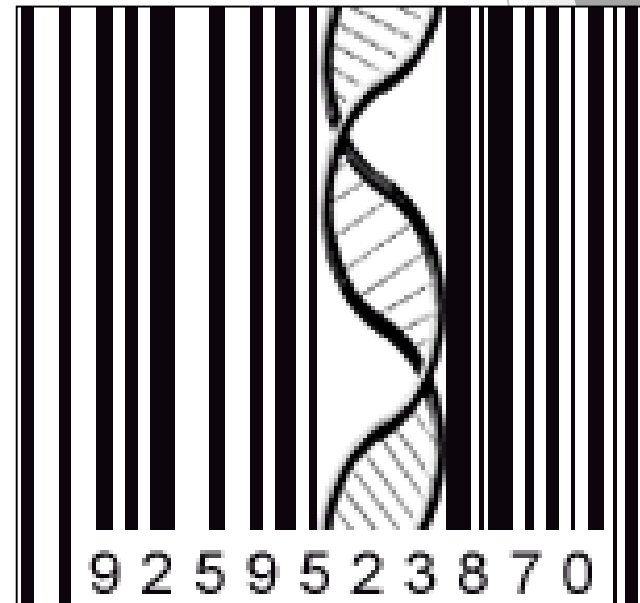
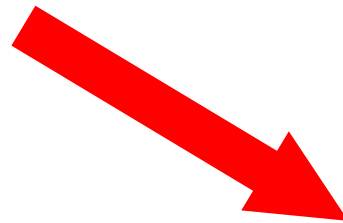


Paul D.N.
Hebert

MESSAGGIO FACILE E DIRETTO UN “DNA BARCODING” UNIVERSALE



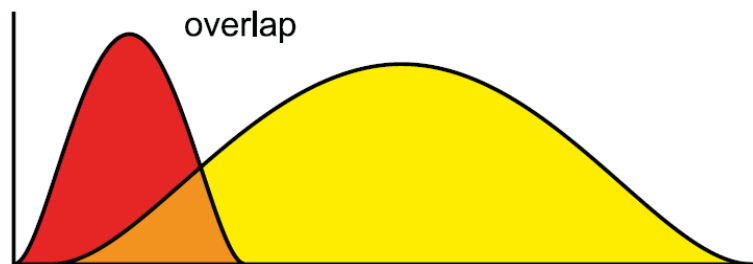
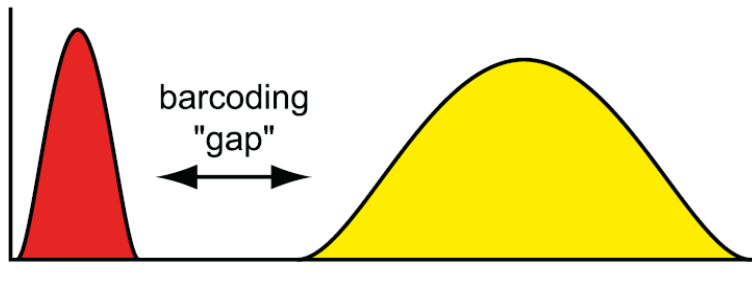
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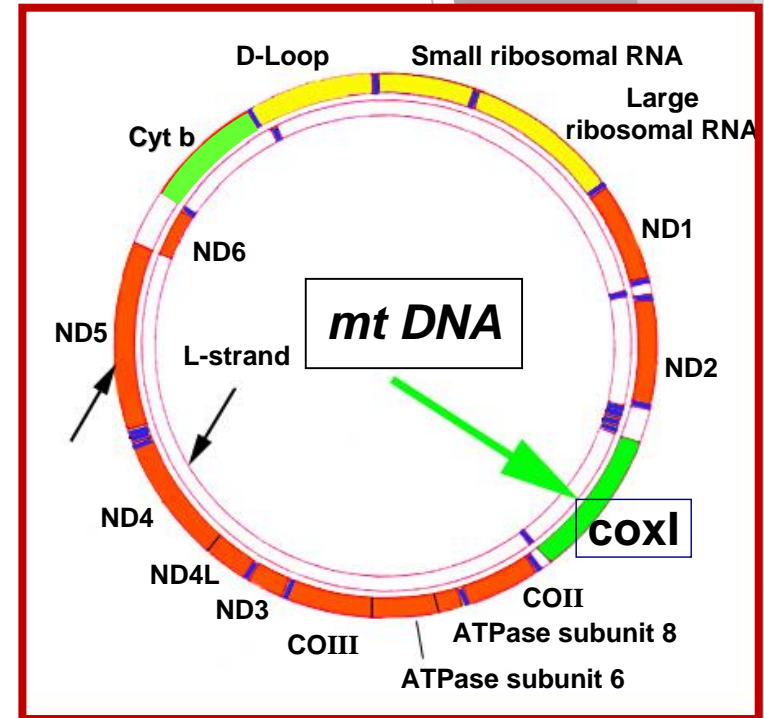
CARATTERISTICHE DELLA REGIONE "DNA BARCODING"

- Sequenza di DNA polimorfica
- Regioni fiancheggianti conservate
- Facilmente amplificabile
- Dimensioni idonee per il sequenziamento

- Bassa variabilità intraspecifica
- Alta diversità interspecifica



From Meyer and Paulay, PLoS Biology, 2005

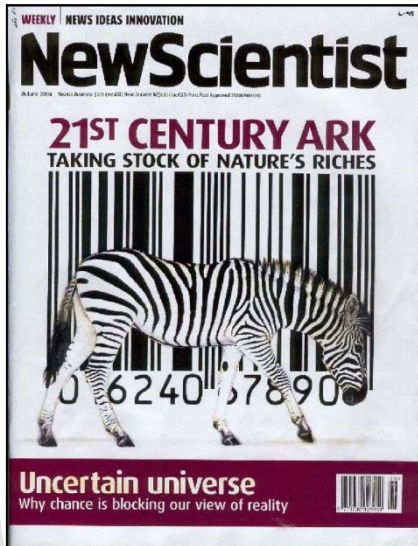


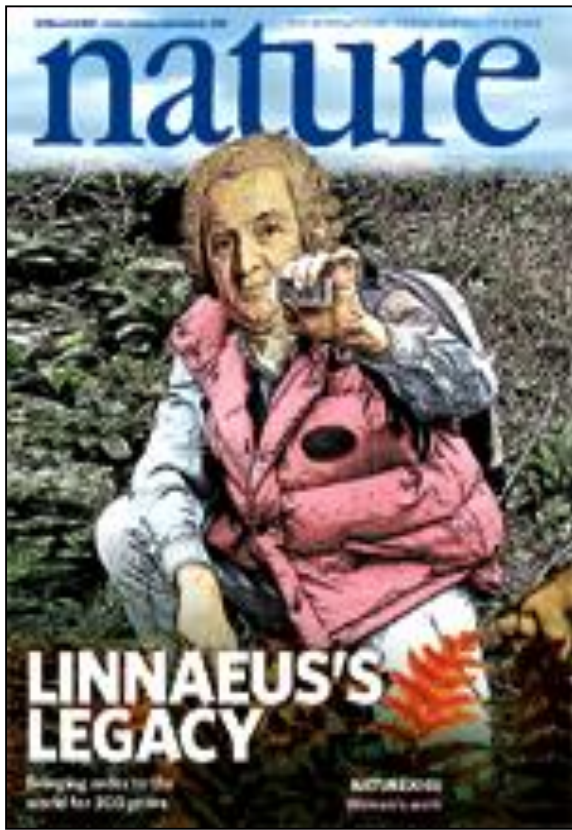
Cytochrome c Oxidase subunit 1

IMMEDIATO ANCHE PER IL CONSUMATORE...PERCHÉ EVOCA IL CODICE A BARRE



HA AVUTO UN IMPATTO ANCHE NEL
MONDO SCIENTIFICO





il DNA *barcoder*



Handheld DNA
barcoder:

1 minute,
1 sequence,
1 name,
1 penny.



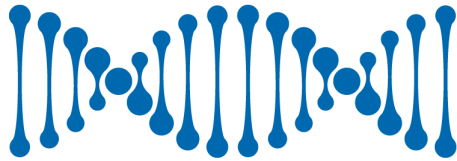
Nature 446, 231, 15 March 2007

il tricorder



QUAL E' L'INNOVAZIONE DEL 'DNA BARCODING' ?

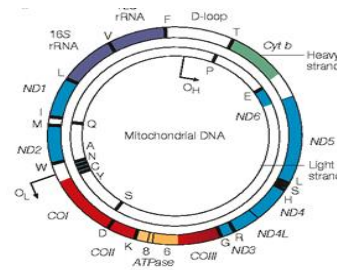
MOLECULARIZATION



COMPUTERIZATION



STANDARDIZATION






Fish barcode of life (FISH-BOL)

research

- ▾ Vision
- ▾ Background
- ▾ Enabling Tools
- ▾ Regional Perspectives
- ▾ Protocols

resources

- ▾ Administration



RELATED BARCODING CAMPAIGNS:



MAMMALIABOL
iBOL WG 1.1



MARINEBOL
iBOL WG 1.8

Fish DNA Barcoding

The Fish Barcode of Life Initiative (FISH-BOL), is a global effort to coordinate an assembly of a standardised reference sequence library for all fish species, one that is derived from voucher specimens with authoritative taxonomic identifications. The benefits of barcoding fishes include facilitating species identification for all potential users, including taxonomists; highlighting specimens that represent a range expansion of known species; flagging previously unrecognized species; and perhaps most importantly, enabling identifications where traditional methods are not applicable.

2009-2010



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DNA-based Seafood Identification

2017



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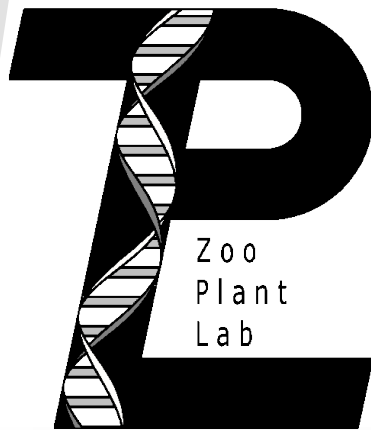
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Food

Home > Food > Science & Research (Food) > DNA-based Seafood Identification

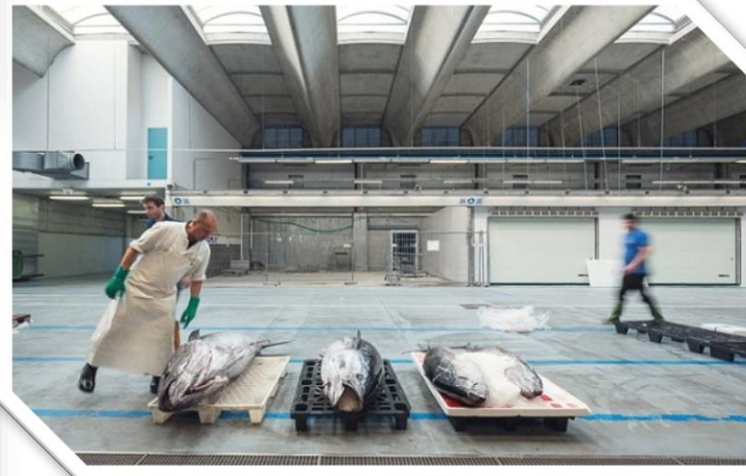
DNA-based Seafood Identification

Reference Standard Sequence Library for Seafood Identification (RSSL)

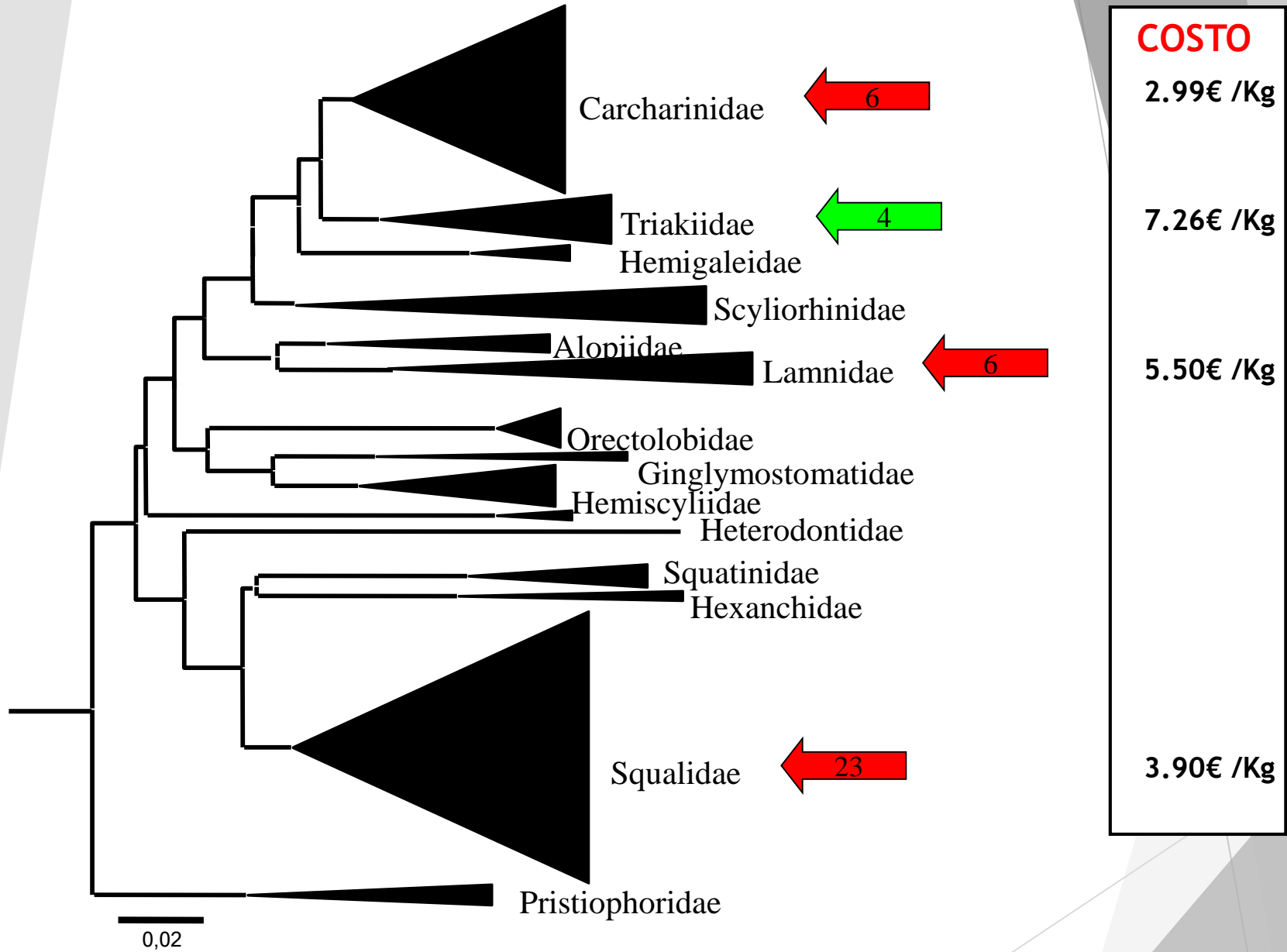


IL CASO DEL PALOMBO

(Mustelus asterias; Mustelus mustelus)



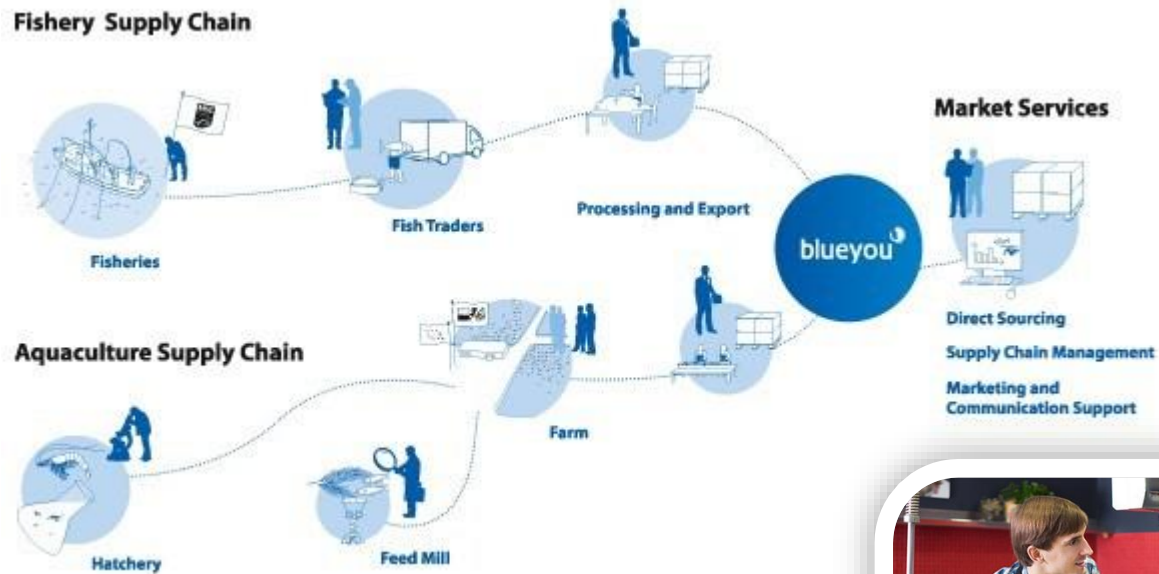
15-20 TONNELLATE DI
“SQUALO” AL MESE



M. Barbuto, A. Galimberti, E. Ferri, M. Labra, R. Malandra, P. Galli, M. Casiraghi (2010). DNA barcoding reveals fraudulent substitutions in shark seafood products: the Italian case of “palombo” (Mustelus spp.). Food Research International 43: 376-381

LA LUNGA STRADA DEL PESCE...

Fishery Supply Chain

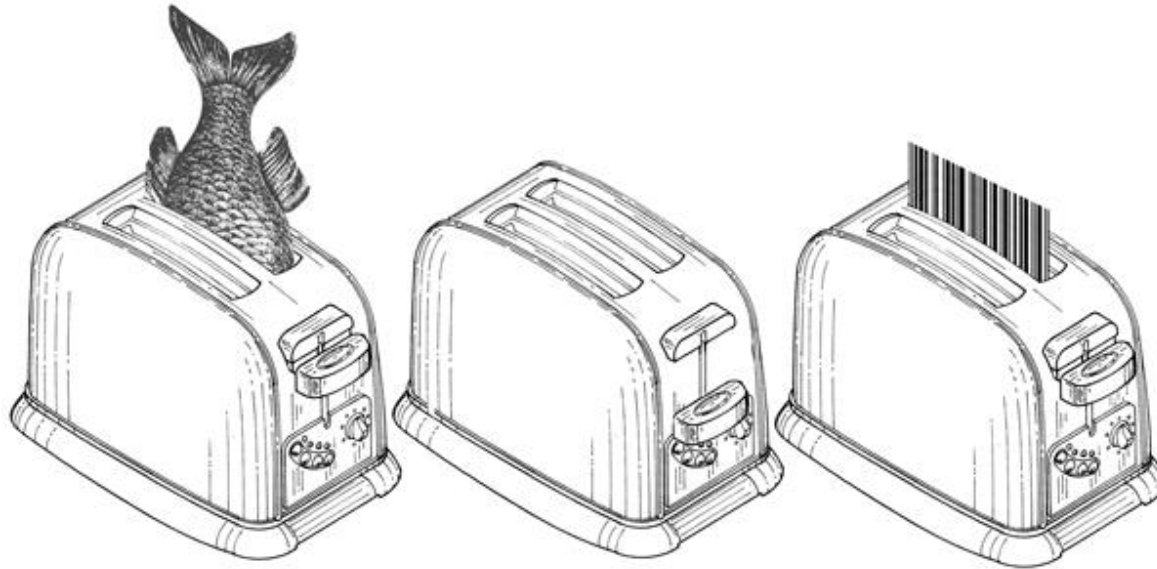


...LA GARANZIA DAL PRODUTTORE AL
CONSUMATORE



...LA DIFFIDENZA DEL
CONSUMATORE E' AUMENTATA

SVILUPPARE UN SISTEMA RAPIDO DI TRACCIABILITÀ...ALLA PORTATA DEL CONSUMATORE



PESCE

1



**ESTRAZIONE
RAPIDA DEL
DNA**



2



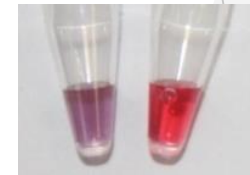
**AMPLIFICAZIONE
REGIONE DNA
BARCODING**



3

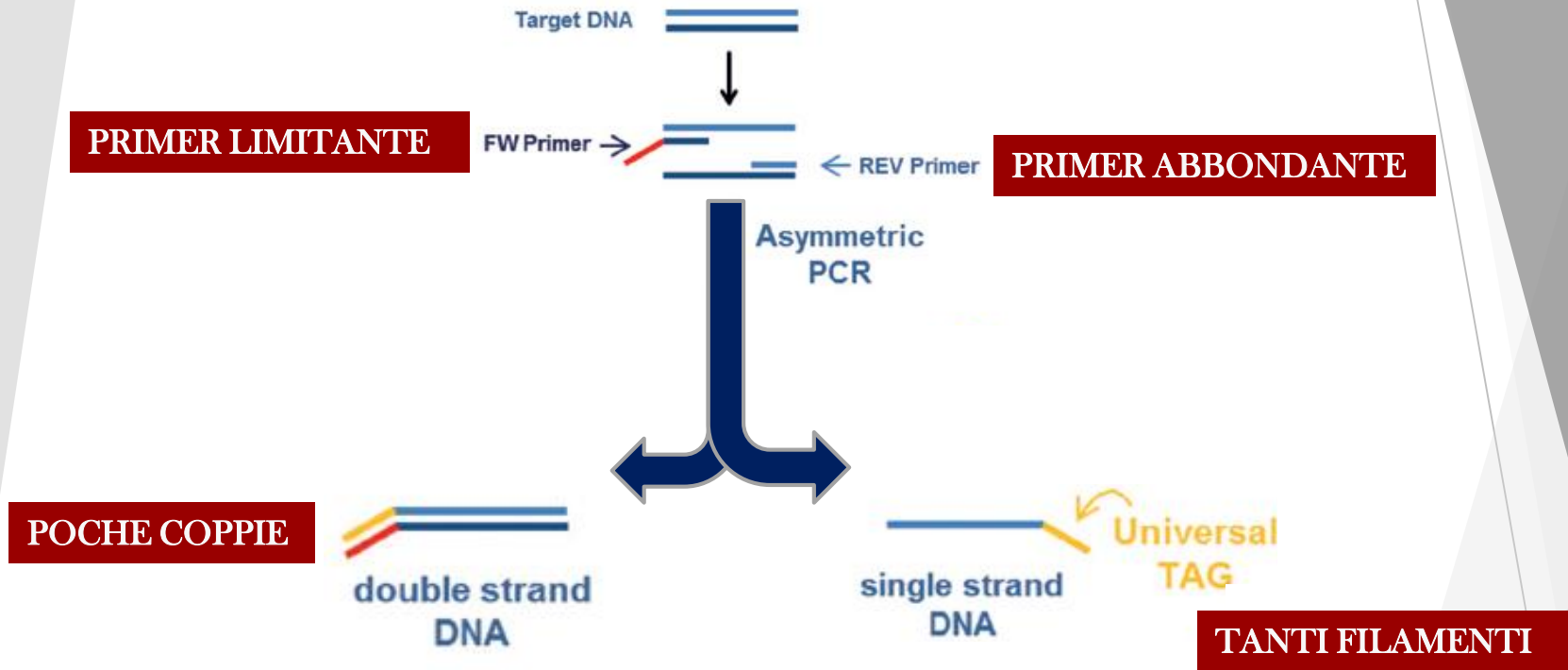


**LETTURA AD
OCCHIO NUDO**



Result

FASE DI ESTRAZIONE E AMPLIFICAZIONE



FASE DI RILEVAZIONE COLORIMETRICA

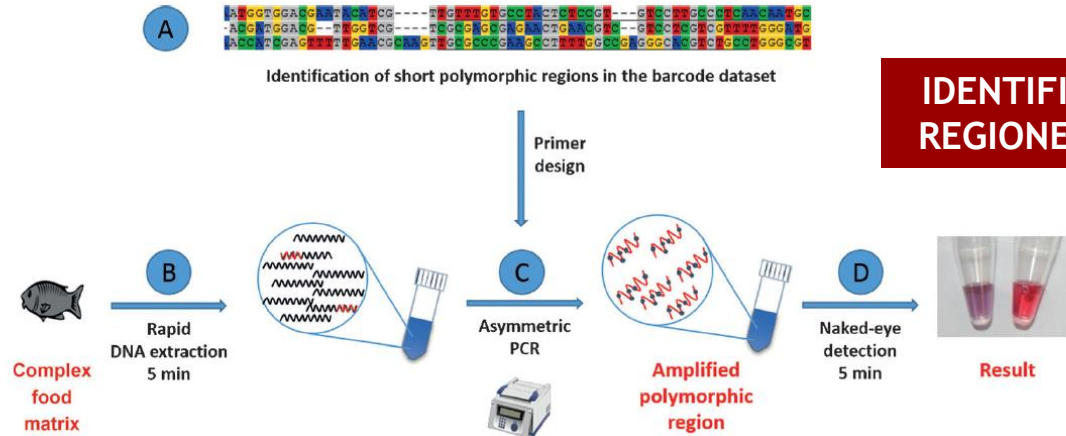
POSITIVO



NEGATIVO



APPLICAZIONE AL SETTORE ITTICO

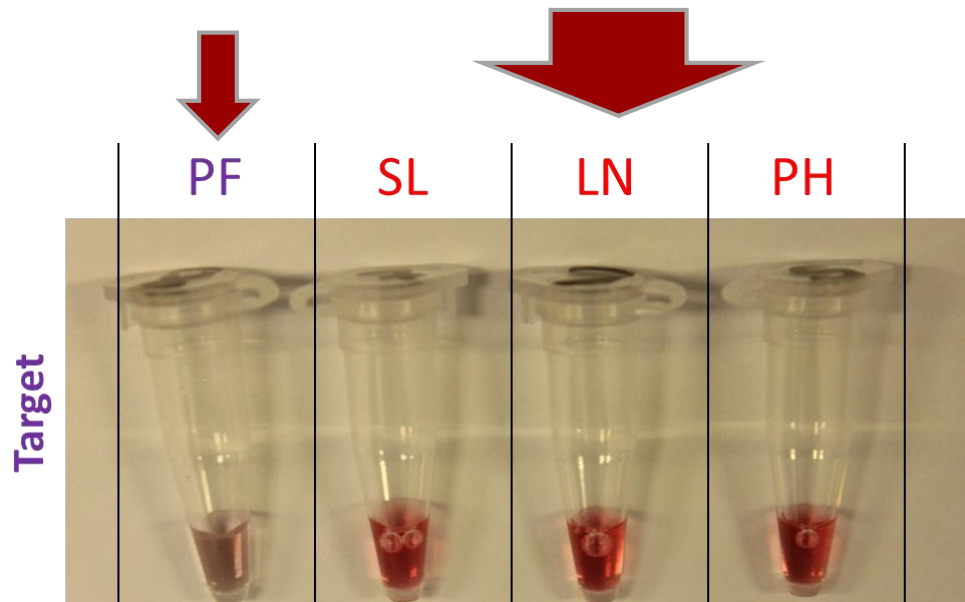


	PF	SL	LN	PH
Target				
Positive Control				

PF=P. fluviatilis = persico
 SL=S. lucioperca = lucioperca
 LN=L. niloticus= perca del Nilo
 PH=P. hypophthalmus = pangasio

16S rDNA – universale nei osteitti

RISOTTO AL PESCE PERSICO TIPICO DEI LAGHI LOMBARDI



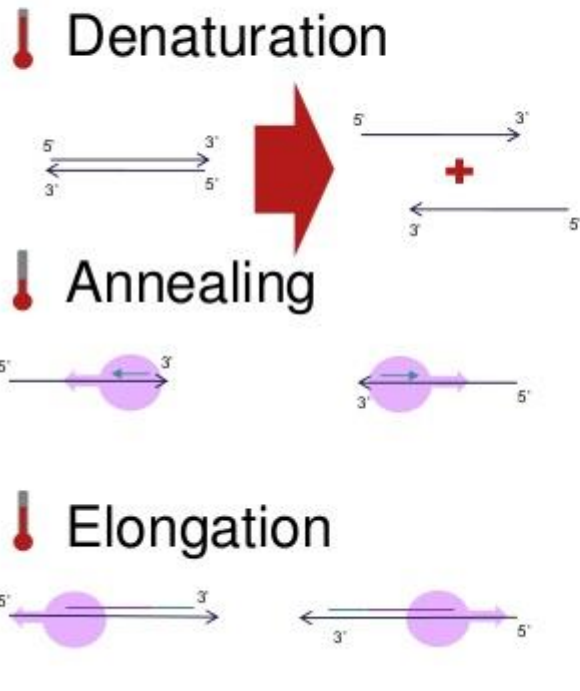
TRACCIABILITÀ MOLECOLARE PER IL CONSUMATORE FINALE



**SVILUPPO DI UNA SOLUZIONE
RAPIDA DI ESTRAZIONE. NESSUNA
COMPLICAZIONE TECNICA**



PCR vs. LAMP

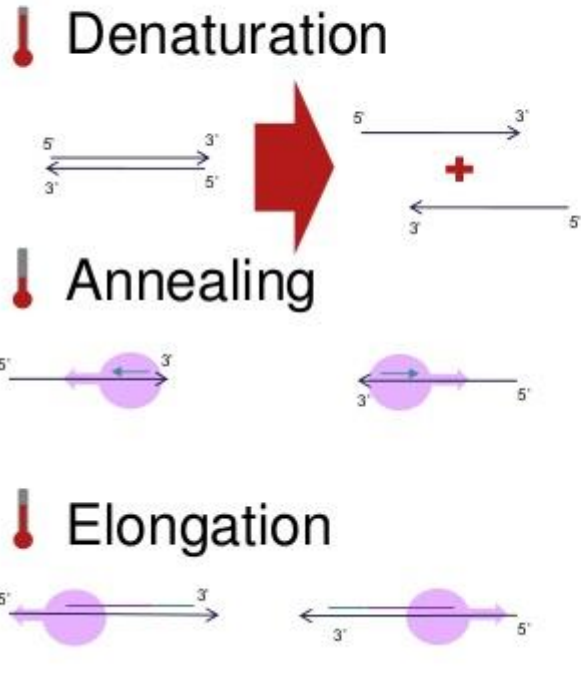


Constant
Temperature:

Looping of DNA for
replication via
multiple primers



PCR vs. LAMP



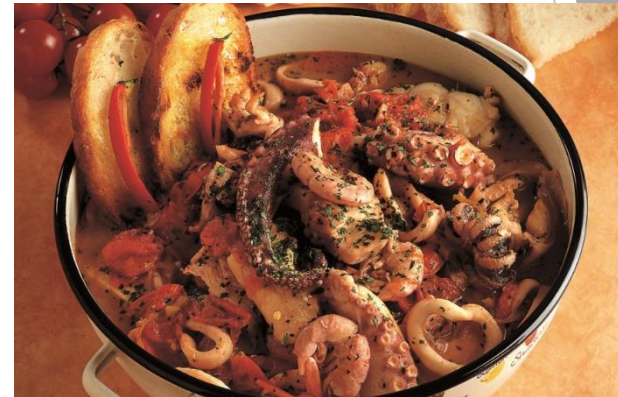
Constant
Temperature:

Looping of DNA for
replication via
multiple primers

MATRICI COMPLESSE: CONTAMINAZIONI, SOSTITUZIONI, ECC



	TARGET	FRAUD	CONTROL
AUTHENTIC			
SUBSTITUTED			
DILUTED			



Fino a pochi ng di DNA

Food Authentication

International Edition: DOI: 10.1002/anie.201702120

German Edition: DOI: 10.1002/ange.201702120

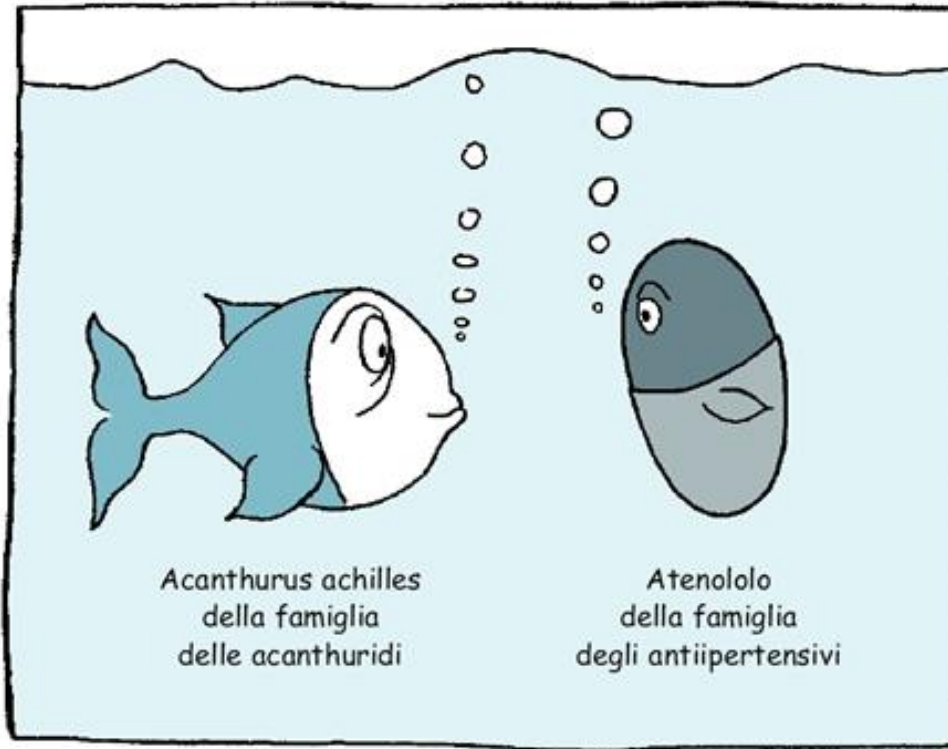
DNA Barcoding Meets Nanotechnology: Development of a Universal Colorimetric Test for Food Authentication

Paola Valentini[†], Andrea Galimberti[†], Valerio Mezzasalma, Fabrizio De Mattia, Maurizio Casiraghi, Massimo Labra,^{} and Pier Paolo Pompa^{*}*

PATENT WO2016097953**IN ARRIVO IL NANOTRACER**

CUSTOMER





Massimo Labra - UNIMIB
Andrea Galimberti - UNIMIB
Pierpaolo Pompa - IIT