

# Agricultural Research and High Performance Networking



# Overview

- Introduction to IRRI
- Crop Research Informatics Lab
- Rice and Fish
- Trends in Agricultural Research
- Conclusions

***Mission:***

**Reduce poverty  
and hunger,**

**Improve the health  
of rice farmers and  
consumers,**

**Ensure  
environmental  
sustainability**

**Through research  
partnerships**



**Home of the Green  
Revolution**

**Established in 1960 by the Ford and  
Rockefeller Foundations**

# Crop Research Informatics Laboratory



Capturing new research opportunities whilst strengthening quality, reliability and impact of crop research outputs for the resource-poor

# IRRI/CIMMYT Alliance: CRIL

## Manila-Mexico, 1665-1821



120 Days – One Way

# Manila – Mexico City 2008

```
>tracert www.iocd.unam.mx
```

```
Tracing route to organical.fquim.unam.mx [132.248.103.112] over a maximum of 30 hops:
```

1	<1 ms	<1 ms	<1 ms	172.29.4.254
2	1 ms	1 ms	1 ms	202.123.56.254
3	3 ms	2 ms	2 ms	202.123.63.2
4	3 ms	3 ms	3 ms	<u>core-7304-ge1.pregi.net [202.90.149.65]</u>
5	65 ms	65 ms	65 ms	203.181.248.182
6	65 ms	65 ms	65 ms	<u>tpr5-ge0-0-0-6.jp.apan.net [203.181.249.100]</u>
7	190 ms	180 ms	180 ms	losa-tokyo-tp2.transpac2.net [192.203.116.145]
8	251 ms	251 ms	251 ms	cudi-lo-jmb.lsanca.pacificwave.net [207.231.240.142]
9	277 ms	278 ms	278 ms	200.23.60.242
10	291 ms	290 ms	290 ms	200.23.60.225
11	293 ms	292 ms	292 ms	200.23.60.194
12	294 ms	292 ms	292 ms	132.247.255.198
13	292 ms	292 ms	292 ms	ve10.zc-core.unam.mx [132.247.251.201]
14	294 ms	293 ms	292 ms	ve8.iimas-core.unam.mx [132.247.251.129]
15	292 ms	293 ms	294 ms	ve10.iimas-dist.unam.mx [132.247.251.138]
16	293 ms	293 ms	298 ms	organical.fquim.unam.mx [132.248.103.112]

```
Trace complete.
```

```
>ping www.iocd.unam.mx
```

```
Pinging organical.fquim.unam.mx [132.248.103.112] with 32 bytes of data:  
Reply from 132.248.103.112: bytes=32 time=292ms TTL=46
```

**Approximate round trip times in milli-seconds:**

**Minimum = 292ms, Maximum = 292ms, Average = 292ms**

# CRIL Vision

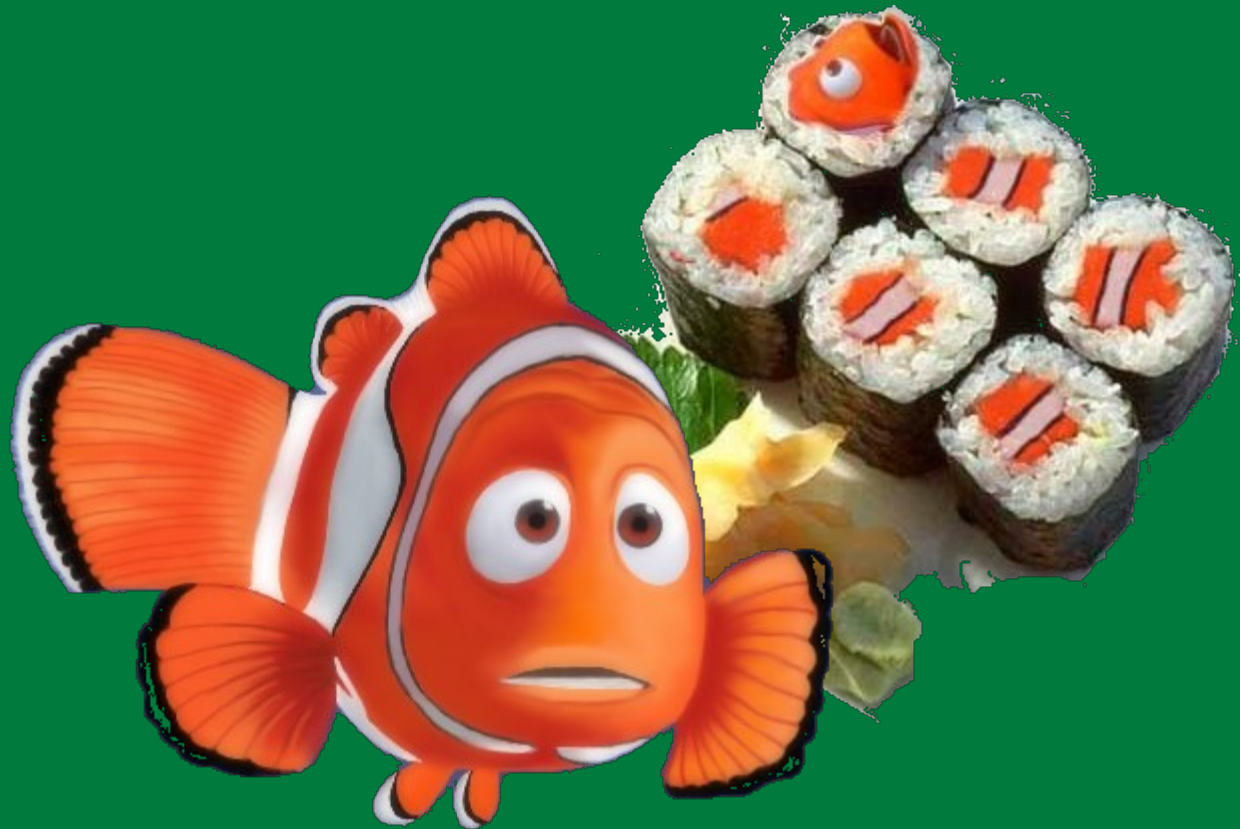
- Assert global scientific leadership in the application of informatics to support research for agricultural development
- Raise the profile of research informatics within and outside IRRI and CIMMYT
- Form a foundation for a global platform of research informatics for crop research

# CRIL High Speed Networking

- Daily team video conferences
- Shared, synchronized codebase
- Distributed software development
- Remote system administration
- Online database backups
- Shared HPC cluster



# Rice & Fish?





## Worldfish: FishBase

- Worldfish Center, Penang, Malaysia (HQ)
- [www.fishbase.org](http://www.fishbase.org)
- Mirrors: .us .de .fr .se .tw .cn .gr
- Development team at IRRI
- 30,900 Species
- 269,600 Common names
- 46,500 Pictures,
- 42,200 References
- 1,600 Collaborators
- 24,000,000 million Hits/month

*Amphiprion percula* (Lacepède, 1802)

<b>Family:</b>	<u>Pomacentridae</u> (Damsel-fishes)
<b>Order:</b>	<u>Perciformes</u> (perch-likes)
<b>Class:</b>	Actinopterygii (ray-finned fishes)
<b>FishBase name:</b>	Orange clownfish
<b>Max. size:</b>	11.0 cm TL (male/unsexed; (Ref. <a href="#">9710</a> ))



| \* [Native range](#) | [All suitable habitat](#) | [PointMap](#) | [Year 2050](#) |



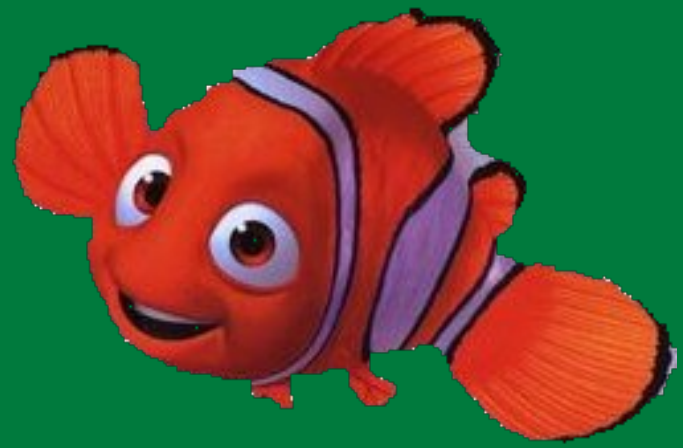
[Amphiprion percula](#) AquaMaps Data sources: [GBIF](#) [OBIS](#)

[Point map](#) |

<b>Environment:</b>	reef-associated; non-migratory; marine; depth range 1 – 15 m (Ref. <a href="#">9710</a> )
<b>Climate:</b>	tropical; 6°S - 26°S, 141°E - 155°E
<b>Importance:</b>	fisheries: of no interest; aquarium: commercial
<b>Resilience:</b>	High, minimum population doubling time less than 15 months(Preliminary K or Fecundity.)
<b>Vulnerability:</b>	Low vulnerability (20.00). (Ref. <a href="#">59153</a> )
<b>Distribution:</b>	Western Pacific: Queensland and Melanesia including northern Great Barrier Reef, northern New Guinea, New Britain, Solomon Islands and Vanuatu. Not known from New Caledonia and the Fiji Islands, although Fowler (1959) recorded it from the latter area. Often confused with <i>Amphiprion ocellaris</i> .
<a href="#">Gazetteer</a>	
<b>Morphology:</b>	<u>Dorsal spines</u> (total): 9 - 10; <u>Dorsal soft rays</u> (total): 14 - 17; <u>Anal spines</u> : 2; <u>Anal soft rays</u> : 11 – 13. Overall orange with three black-bordered vertical white bands. The fins also orange with black edges. Dorsal count of 9 spines (Ref. 48636).
<b>Biology:</b>	Inhabits lagoon and seaward reefs (Ref. <a href="#">9710</a> ). Each group of fish consists of a breeding pair and 0-4 non-breeders. Within each group there is a size-based hierarchy: the female is largest, the male is second largest, and the non-breeders get progressively smaller as the hierarchy is descended. If the female dies, the male changes sex and becomes the breeding female, while the largest non-breeder becomes the breeding male. The maintenance of size differences may avoid conflicts, because subordinates do not become a threat to their dominants (Ref. <a href="#">47841</a> ). Appears to occur in shallower depths than <i>A. ocellaris</i> . This species has been reared in captivity (Ref. <a href="#">35404</a> , <a href="#">35413</a> , <a href="#">35420</a> ). Associated with the anemones: <i>Heteractis crispa</i> , <i>Heteractis magnifica</i> , and <i>Stichodactyla gigantea</i> (Ref. <a href="#">5911</a> ).
<b>Red List Status:</b>	<a href="#">Not Evaluated</a> (Ref. <a href="#">57073</a> )
<b>Dangerous:</b>	harmless
<b>Coordinator:</b>	<a href="#">Allen, Gerald R.</a>
<b>Main Ref:</b>	<a href="#">Allen, G.R., 1991 . (Ref. 7247)</a>

# Fishbase and High Performance Networking

- Daily synchronization across mirrors
- Collaboration among contributors
- Multi-location archiving
- Single code base
- Load balancing





# An incredibly exciting time for rice research

Simultaneous revolutions in biology, communications, and computational power

Molecular biology, genetics & physiology knowledge explosion

Remote data storage and analysis capacities universally accessible

*Vast arrays of data generated worldwide*

Remote computational power generates new generation of questions and applications

**All this now applicable to the developing world**

# Our Future Agenda

1. Bring about an agronomic revolution in Asian rice production to reduce existing yield gaps
2. Accelerate the delivery of new post harvest technologies to reduce losses
3. Accelerate the introduction and adoption of higher yielding rice varieties (e.g., hybrids)
4. Strengthen and upgrade the rice breeding and research pipelines
5. Accelerate research on the world's thousands of rice varieties so scientists can tap the vast reservoir of untapped knowledge they contain
6. Develop a new generation of rice scientists and researchers for the public and private sectors
7. Increase public investment in agricultural infrastructure
8. Reform policy to improve the efficiency of marketing systems for both inputs and outputs
9. Strengthen food safety nets for the poor