

Emerging Environmental Niches of Drug-Resistant Yeasts: Evidence from Hong Kong Mangroves, Birds, and Fruits

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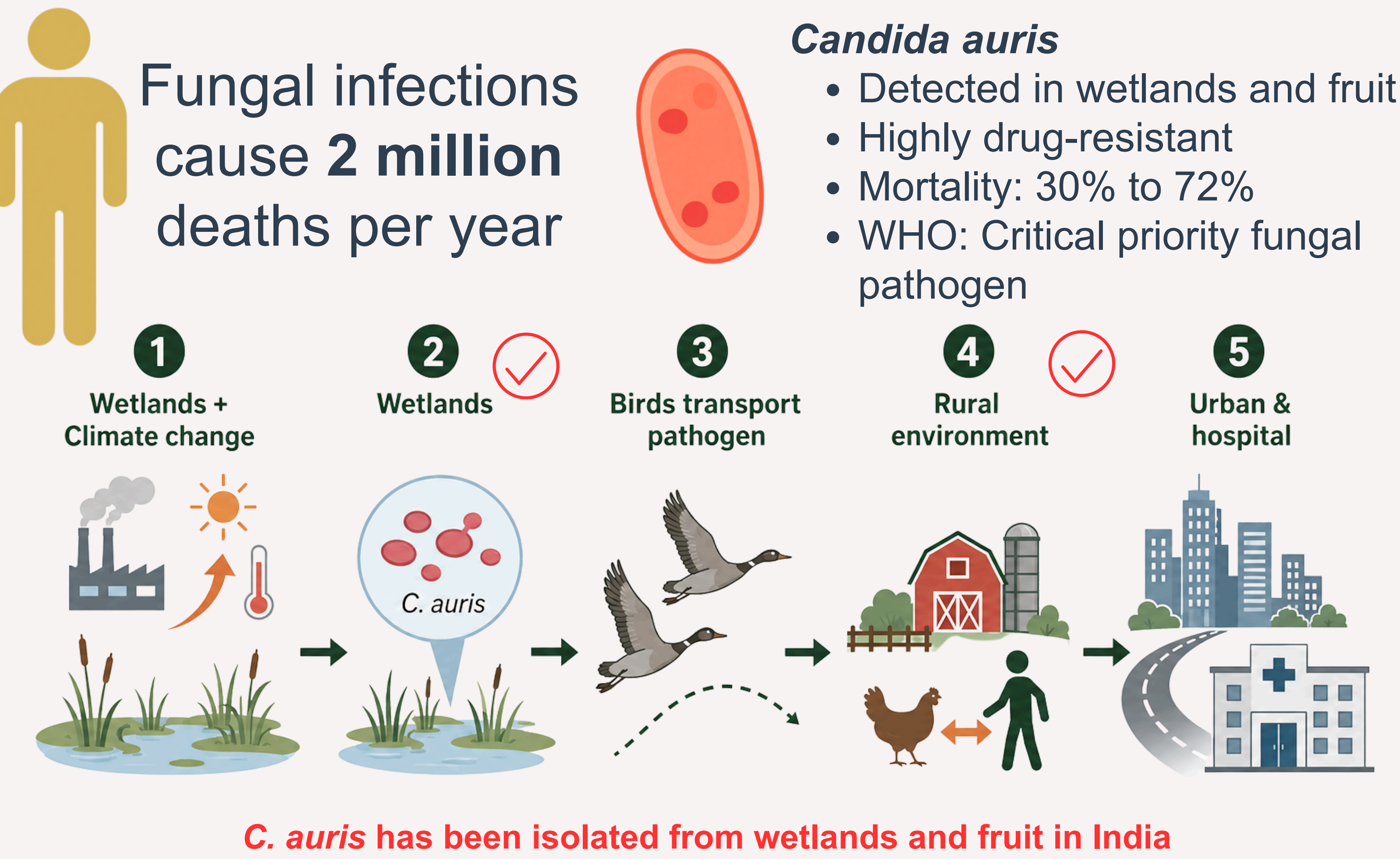
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1. Background: The spread of fungal pathogens



Environmental reservoirs of drug-resistant yeasts in Hong Kong remain underexplored

2. Mangroves: Predominated by *C. parapsilosis*

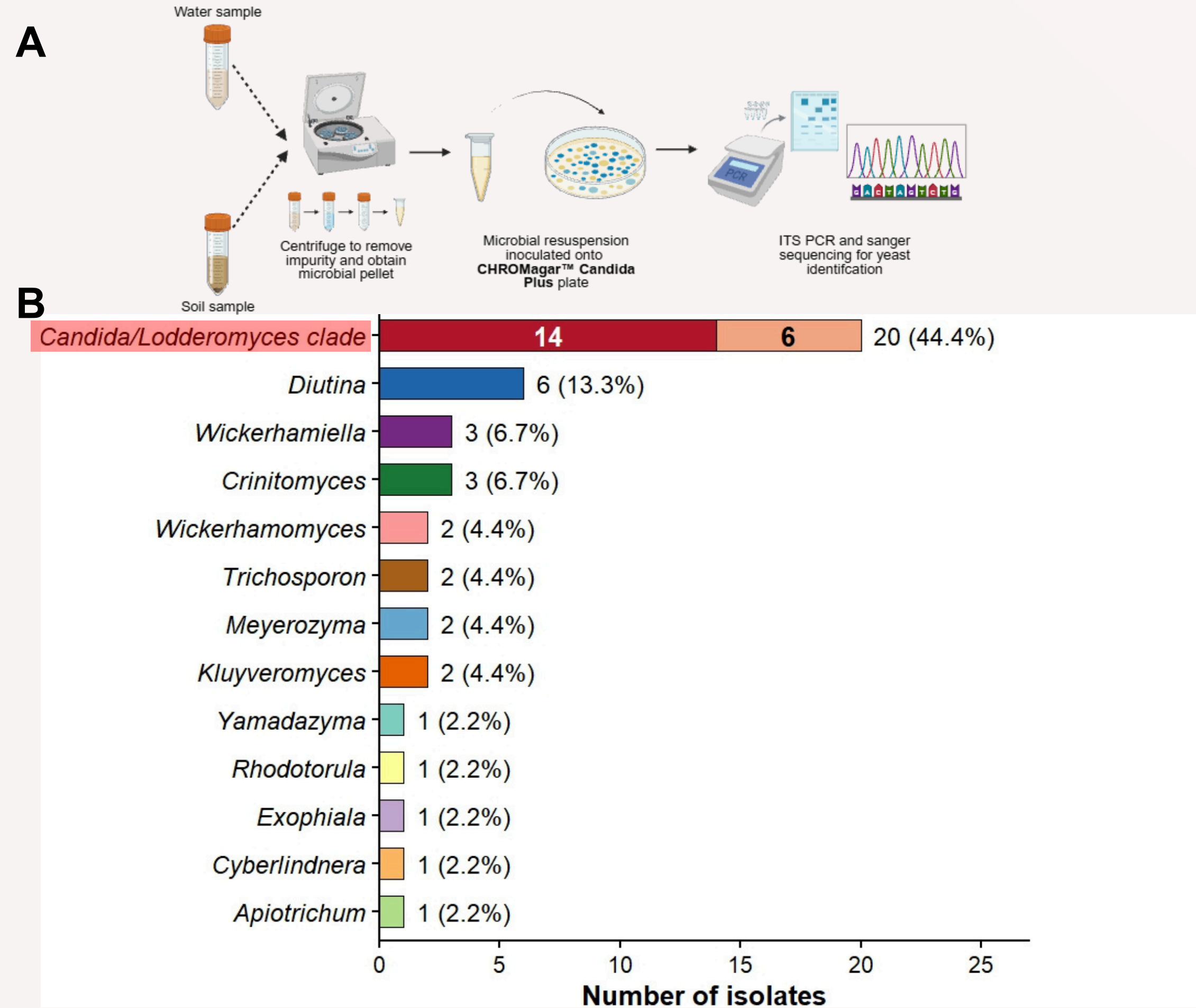


Figure 1. Mangrove yeast isolation and diversity. **A)** Workflow for yeast isolation and ITS-based identification from mangrove water and soil samples. **B)** Taxonomic distribution of 45 isolates, with the *Candida/Lodderomyces* clade ($n = 20$) predominating and *C. parapsilosis* ($n = 14$) representing the major species. **WHO-prioritized fungal pathogens are highlighted in red.**

3. Bird droppings: Predominated by thermotolerant *C. tropicalis*

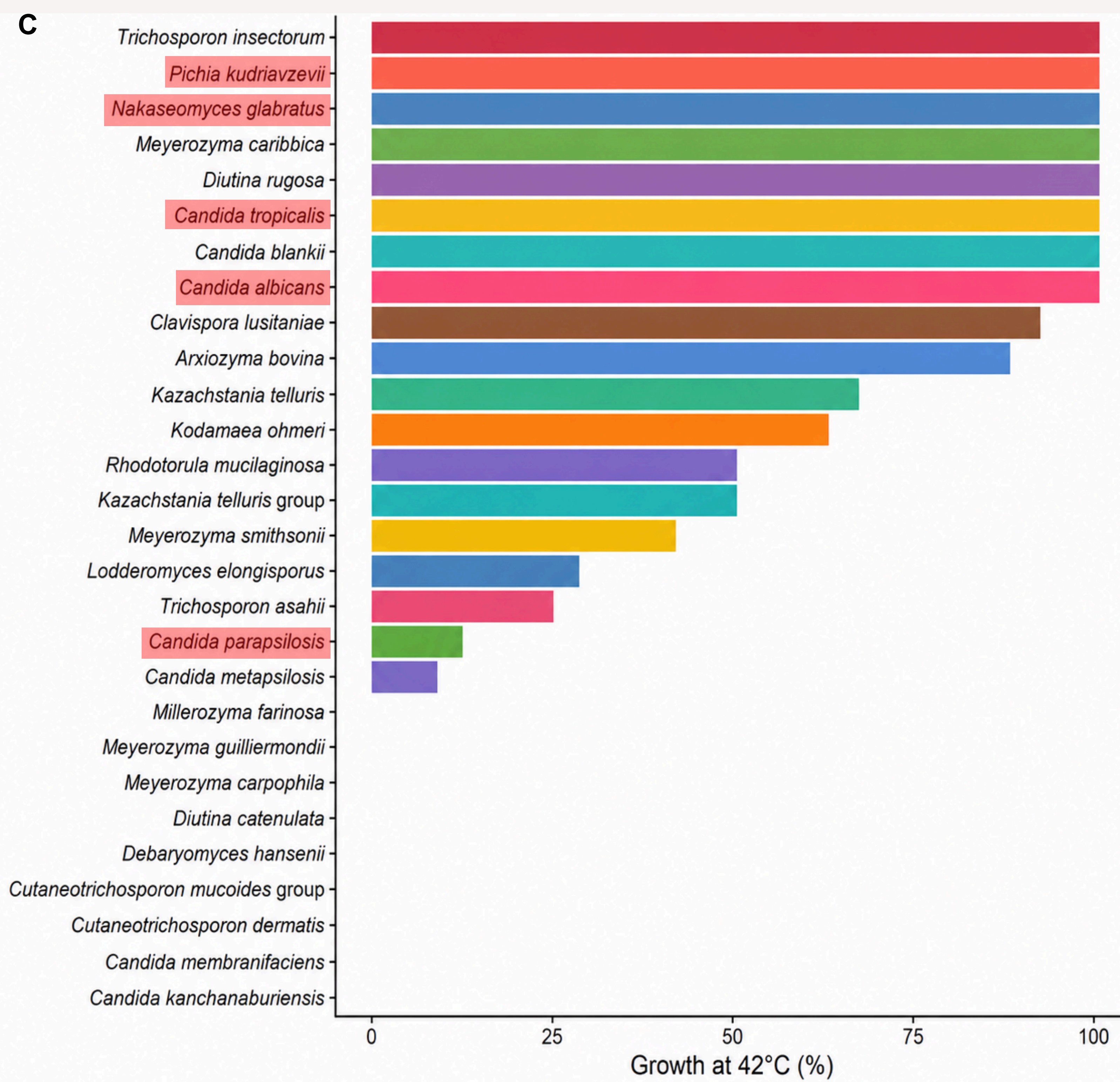
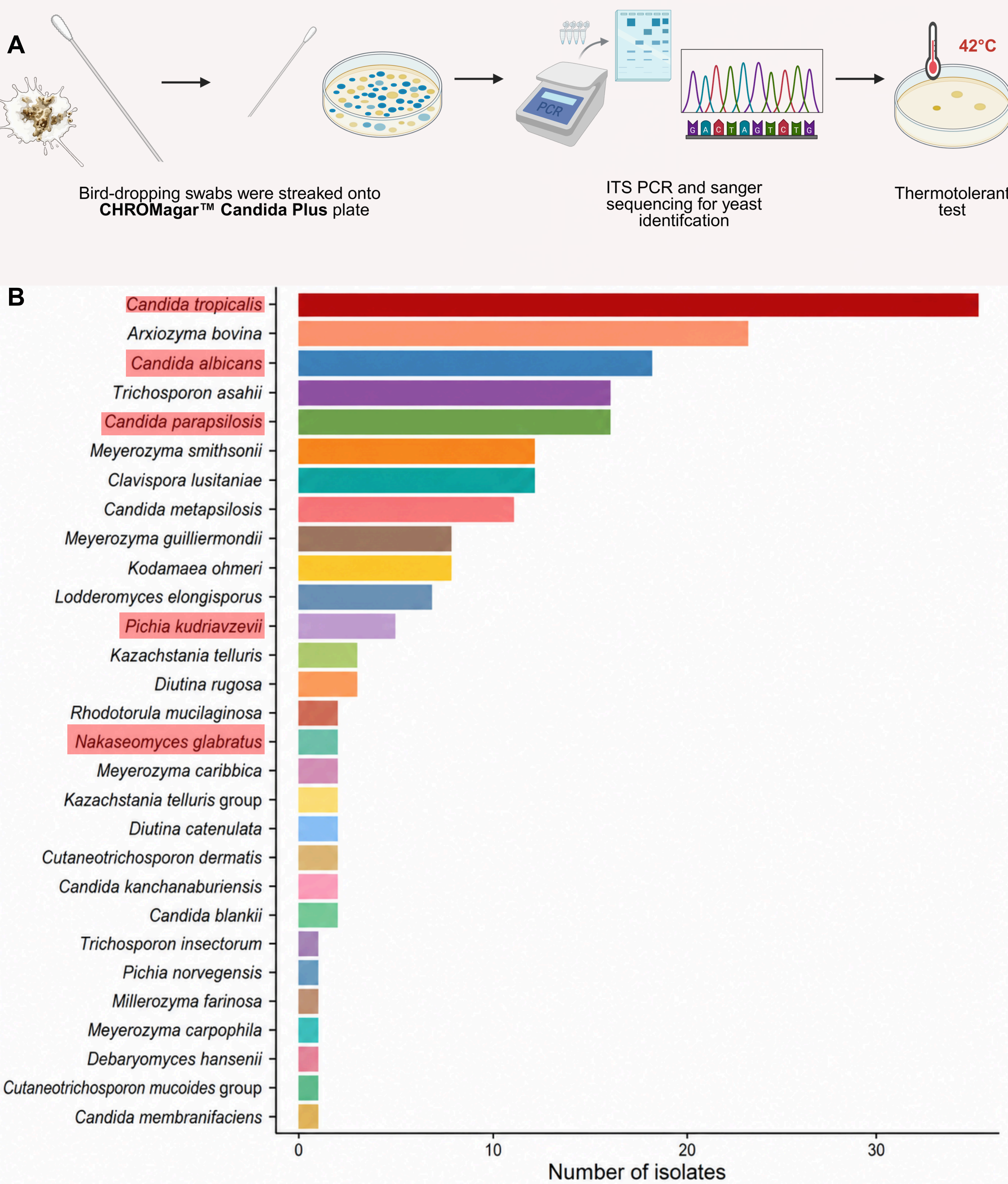


Figure 2. Bird-dropping yeast isolation and thermotolerance profile. **A)** Workflow for yeast recovery from bird-dropping swabs, followed by CHROMagar™ Candida Plus culture and ITS PCR/Sanger sequencing. **B)** Taxonomic distribution of 83 yeast isolates from bird droppings, with *C. tropicalis* predominating. **C)** Growth of representative isolates at 42°C, showing thermotolerance among bird-dropping-associated yeasts. **WHO-prioritized fungal pathogens are highlighted in red.**

4. Fruits: Predominated by *Meyerozyma guilliermondii*

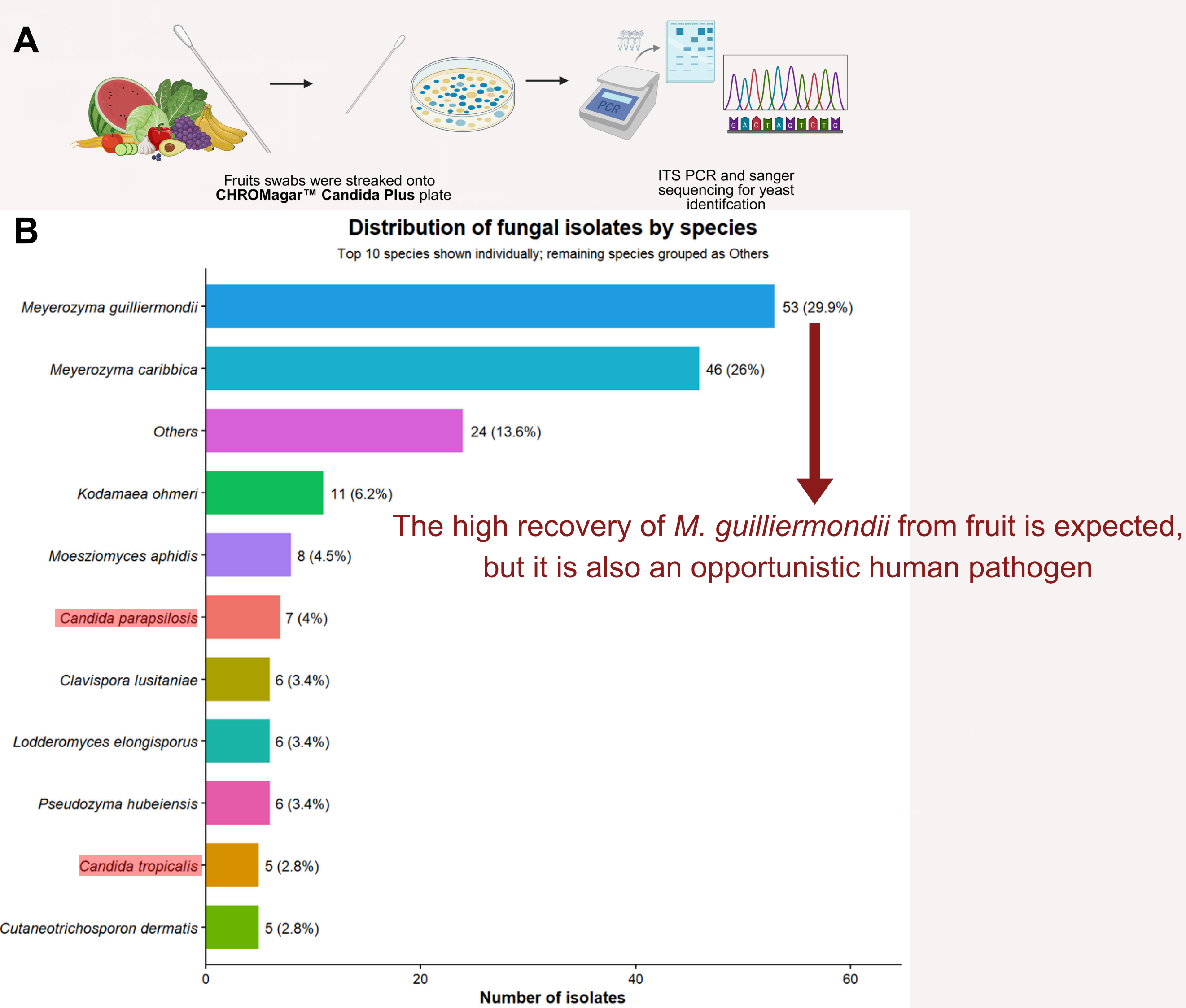
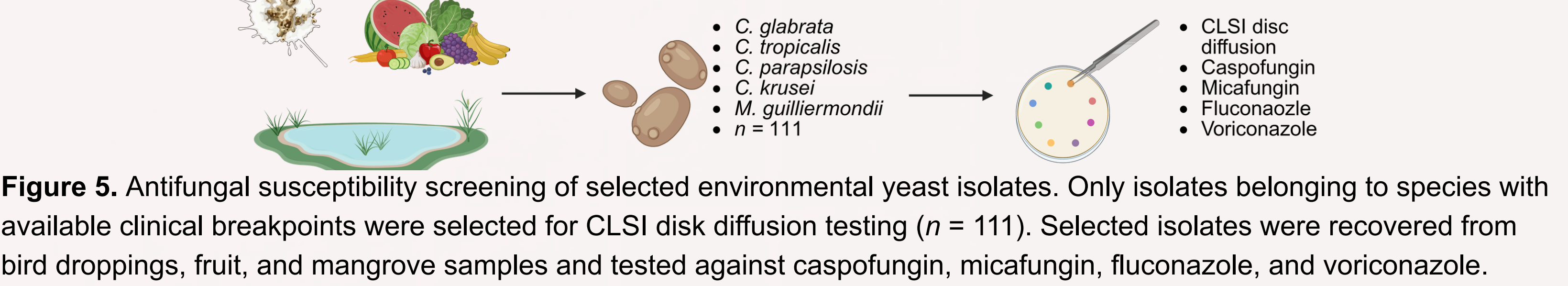


Figure 4. Fruit-associated yeast isolation and diversity. **A)** Fruit swabs were streaked onto CHROMagar™ Candida Plus plates and identified by ITS PCR/Sanger sequencing. **B)** Taxonomic distribution of 177 fruit-derived yeast isolates, with *M. guilliermondii* predominating. **WHO-prioritized fungal pathogens are highlighted in red.**

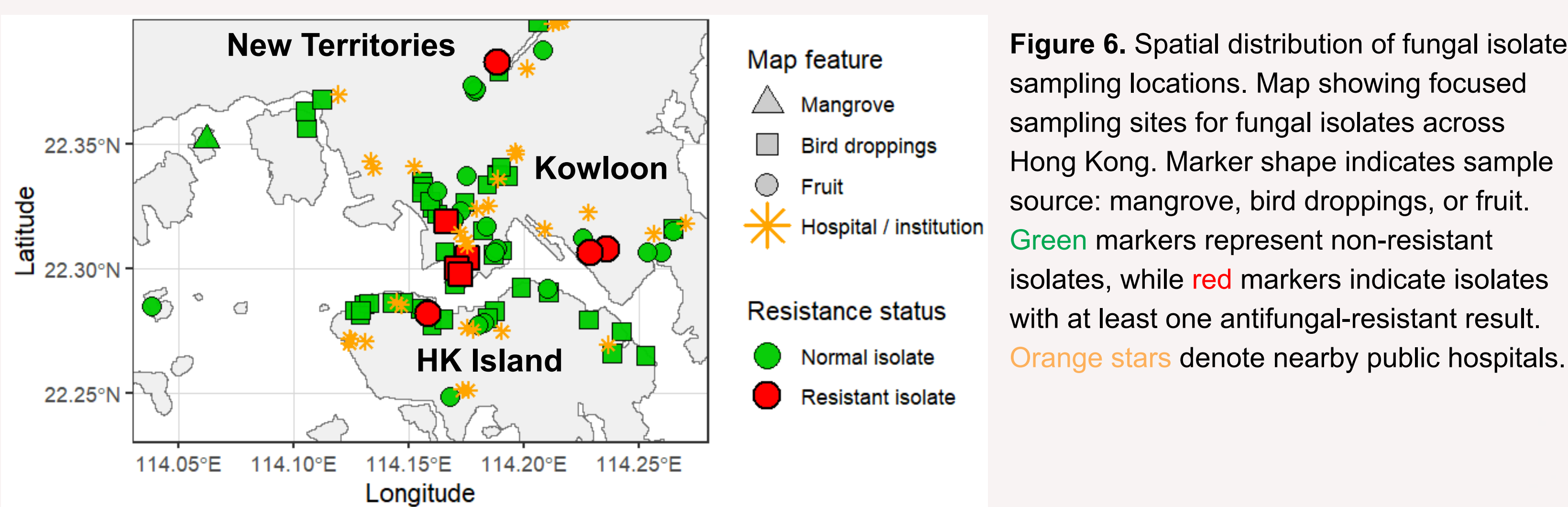
5. Antifungal Susceptibility Testing



Source	Isolate ID	Species	Resistant antifungal(s)	CAS	MIC	FLU	VOR
Bird droppings	6c	<i>Candida tropicalis</i>	FLU, VOR	S	S	R	R
Bird droppings	8a	<i>Candida tropicalis</i>	FLU, VOR	S	S	R	R
Bird droppings	S1c	<i>Candida tropicalis</i>	VOR	S	S	S	R
Bird droppings	S33a	<i>Candida parapsilosis</i>	CAS	R	S	S	S
Bird droppings	S8a	<i>Candida parapsilosis</i>	FLU, VOR	S	S	R	R
Fruit	A16	<i>Meyerozyma guilliermondii</i>	CAS, MIC	R	R	N/A	N/A
Fruit	B2	<i>Meyerozyma guilliermondii</i>	CAS	R	I	N/A	N/A
Fruit	B7	<i>Meyerozyma guilliermondii</i>	CAS, MIC	R	R	N/A	N/A
Fruit	O15	<i>Candida parapsilosis</i>	CAS	R	S	S	S
Fruit	O22	<i>Candida parapsilosis</i>	CAS	R	S	S	S

Table 1. Antifungal-resistant isolates among selected environmental yeasts. Summary of isolates showing at least one resistant antifungal susceptibility result. Resistant calls are highlighted in red. CAS, caspofungin; MIC, micafungin; FLU, fluconazole; VOR, voriconazole; S, susceptible; I, intermediate; R, resistant; N/A, not applicable.

6. Conclusions and Future Studies



- Current studies have identified environmental yeast isolates, but the relationship between environmental and clinical yeast isolates remains unclear
- Whole-genome sequencing of environmental and clinical isolates will be performed to assess possible transmission or relatedness
- Potential fungal pathogens were detected across sampled environmental sites in Hong Kong
- Antifungal-resistant yeast isolates were detected in Hong Kong's environment
- Enhanced surveillance of drug-resistant yeast pathogens in Hong Kong is needed

References

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