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The Resistance of Ecuador Soil Microbiome to Toxic Copper(II) Compounds

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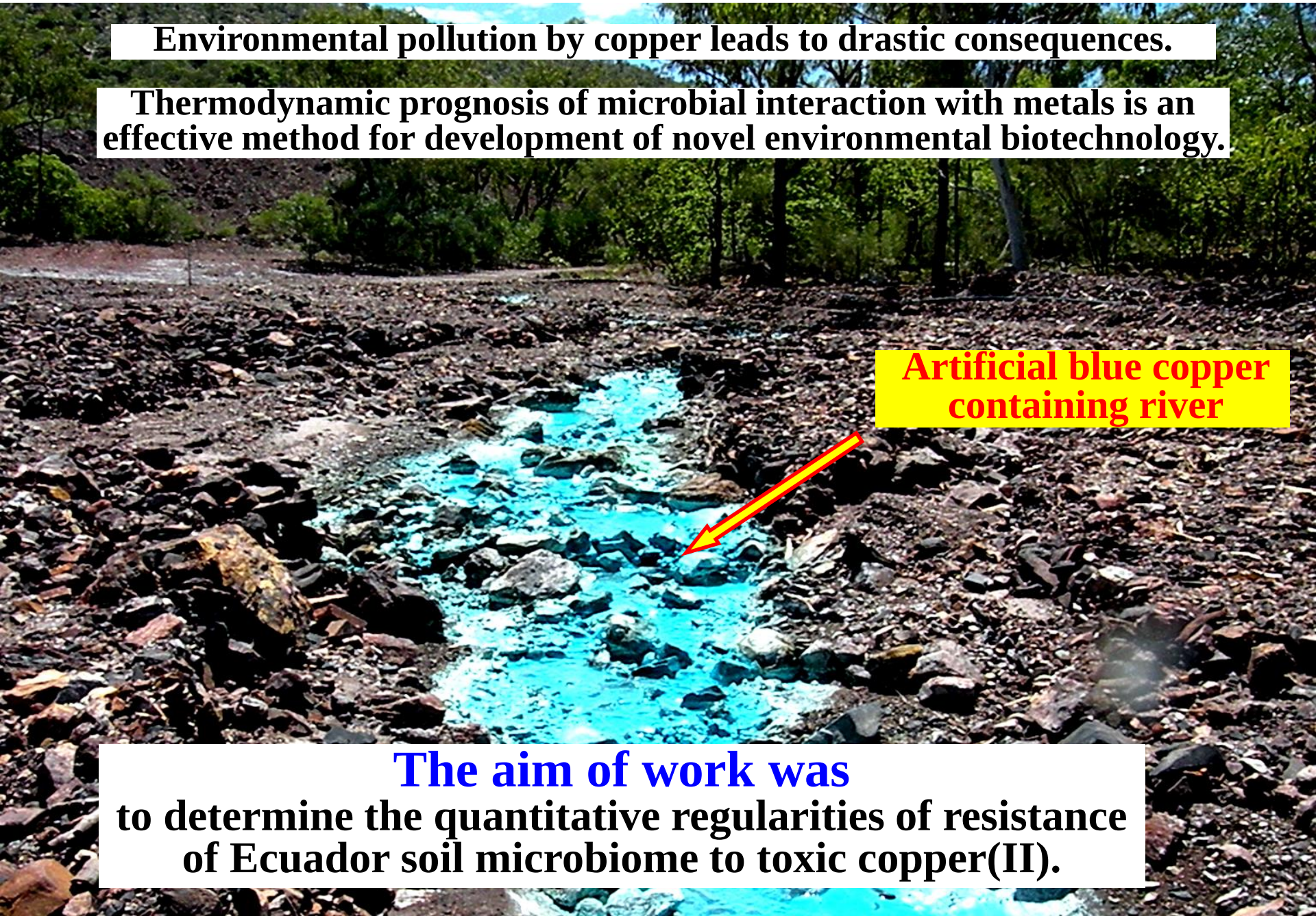
Background

Environmental pollution by copper leads to drastic consequences.

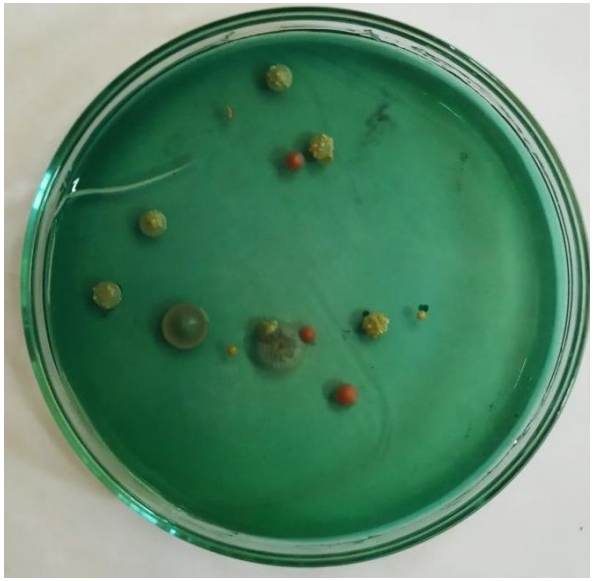
Thermodynamic prognosis of microbial interaction with metals is an effective method for development of novel environmental biotechnology.



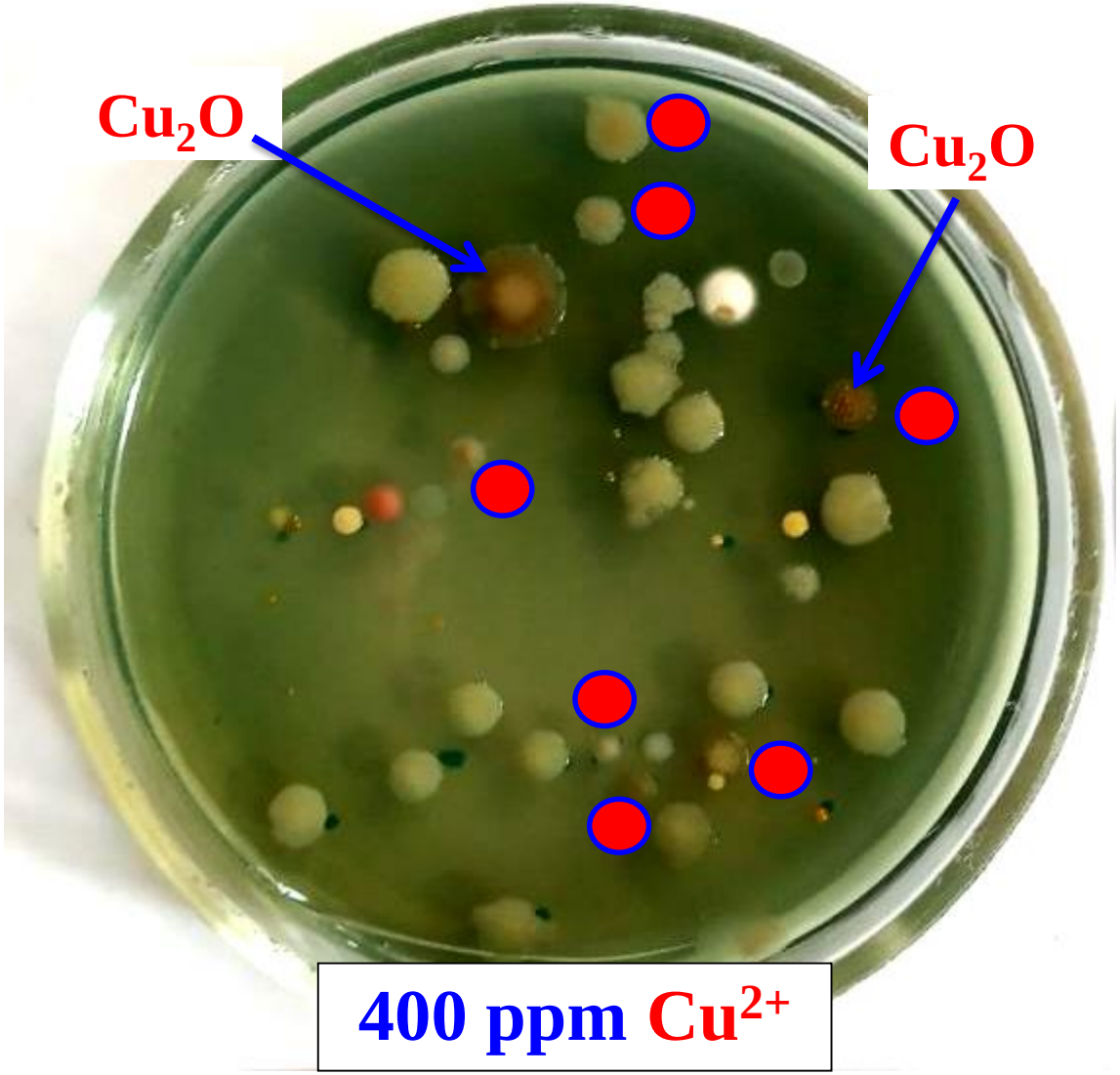
The aim of work was

to determine the quantitative regularities of resistance of Ecuador soil microbiome to toxic copper(II).

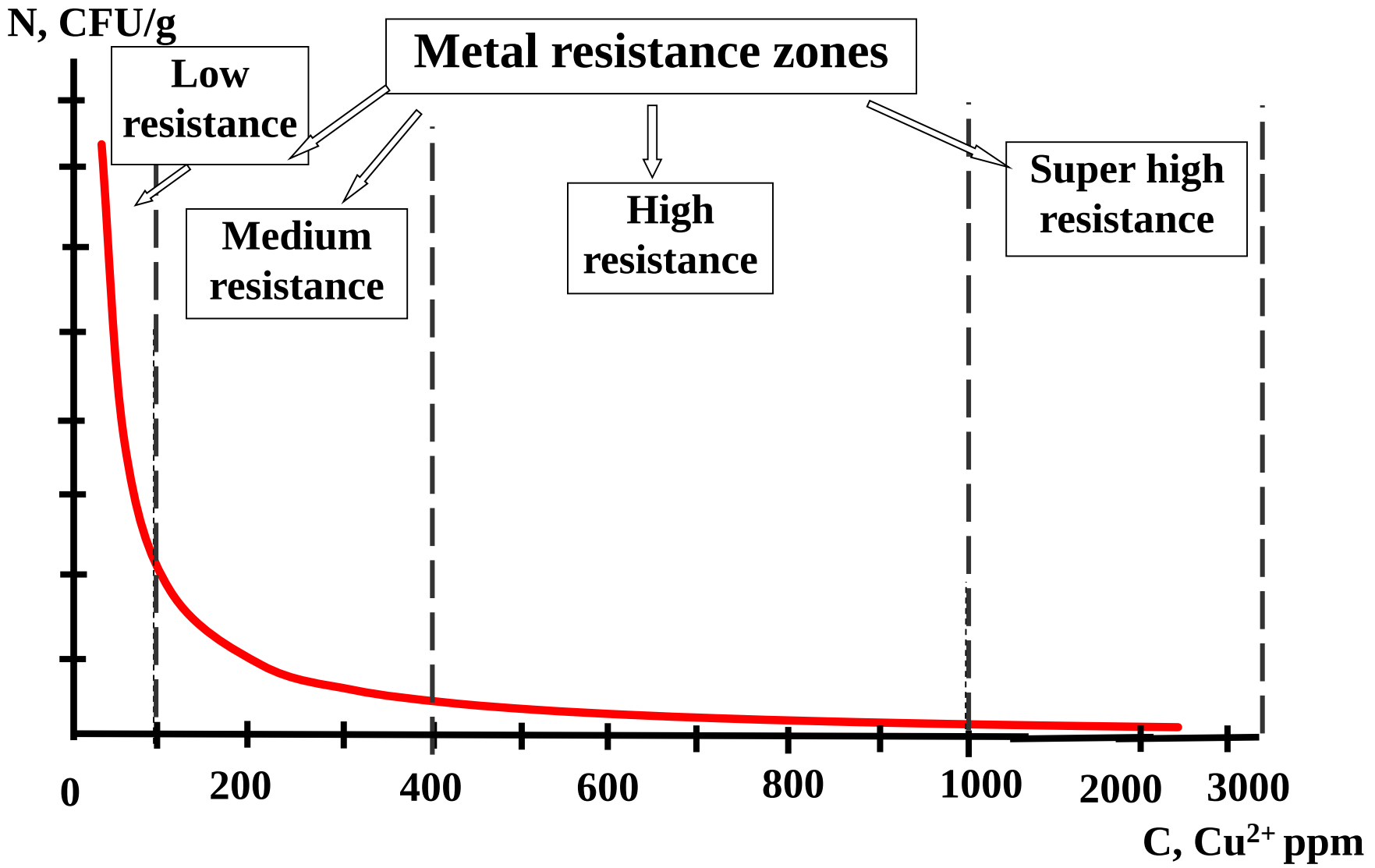
Visual biodiversity of Ecuador soil microbiome is evidence of high level of adaptation to Cu^{2+}



Reduction of Cu^{2+} to Cu_2O by microorganisms of Ecuador soil



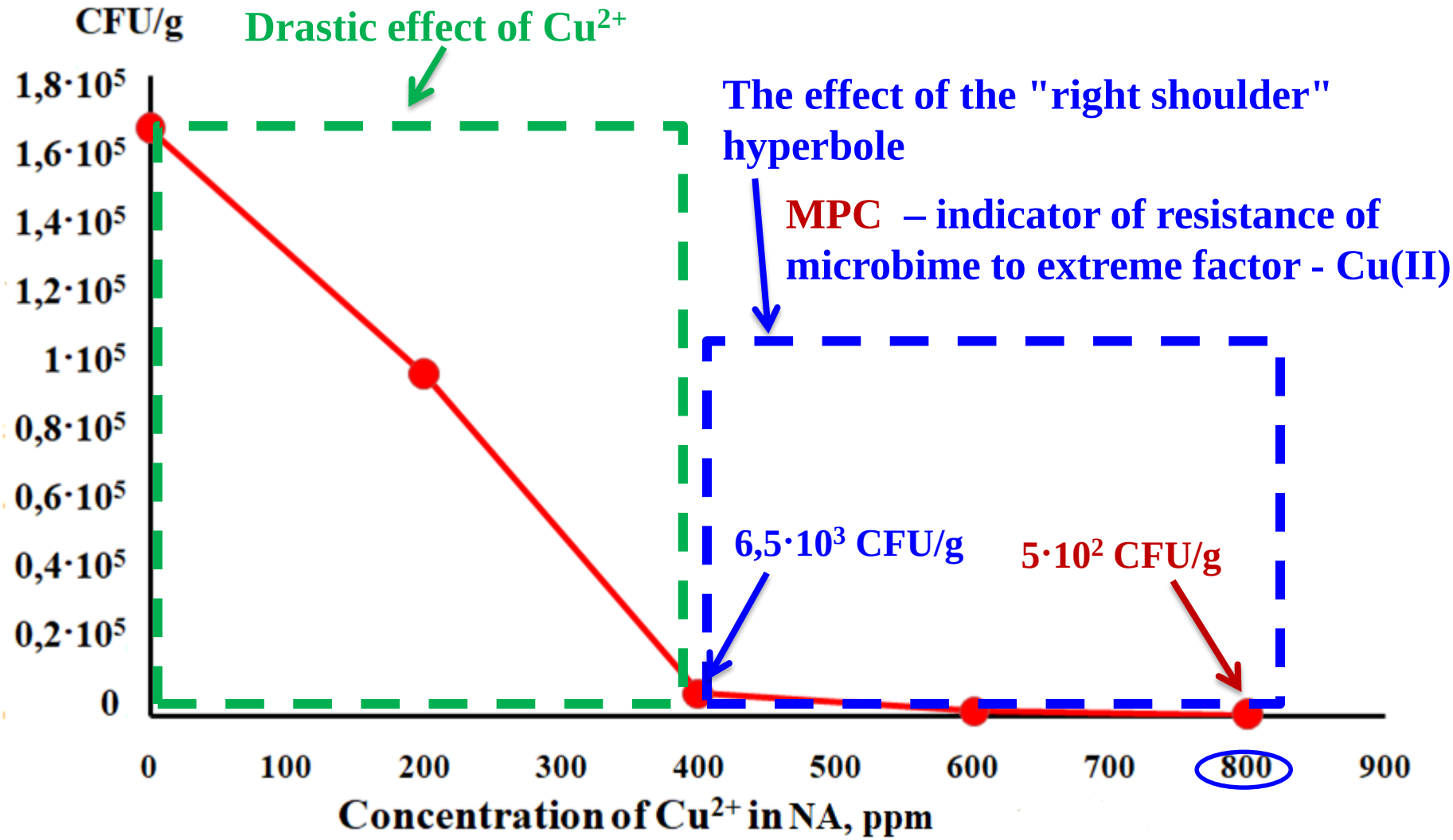
Theoretical model of the distribution of metal resistant microorganisms in natural ecosystems



The resistance of Ecuadorian soil microorganisms to Cu^{2+} in citrate form

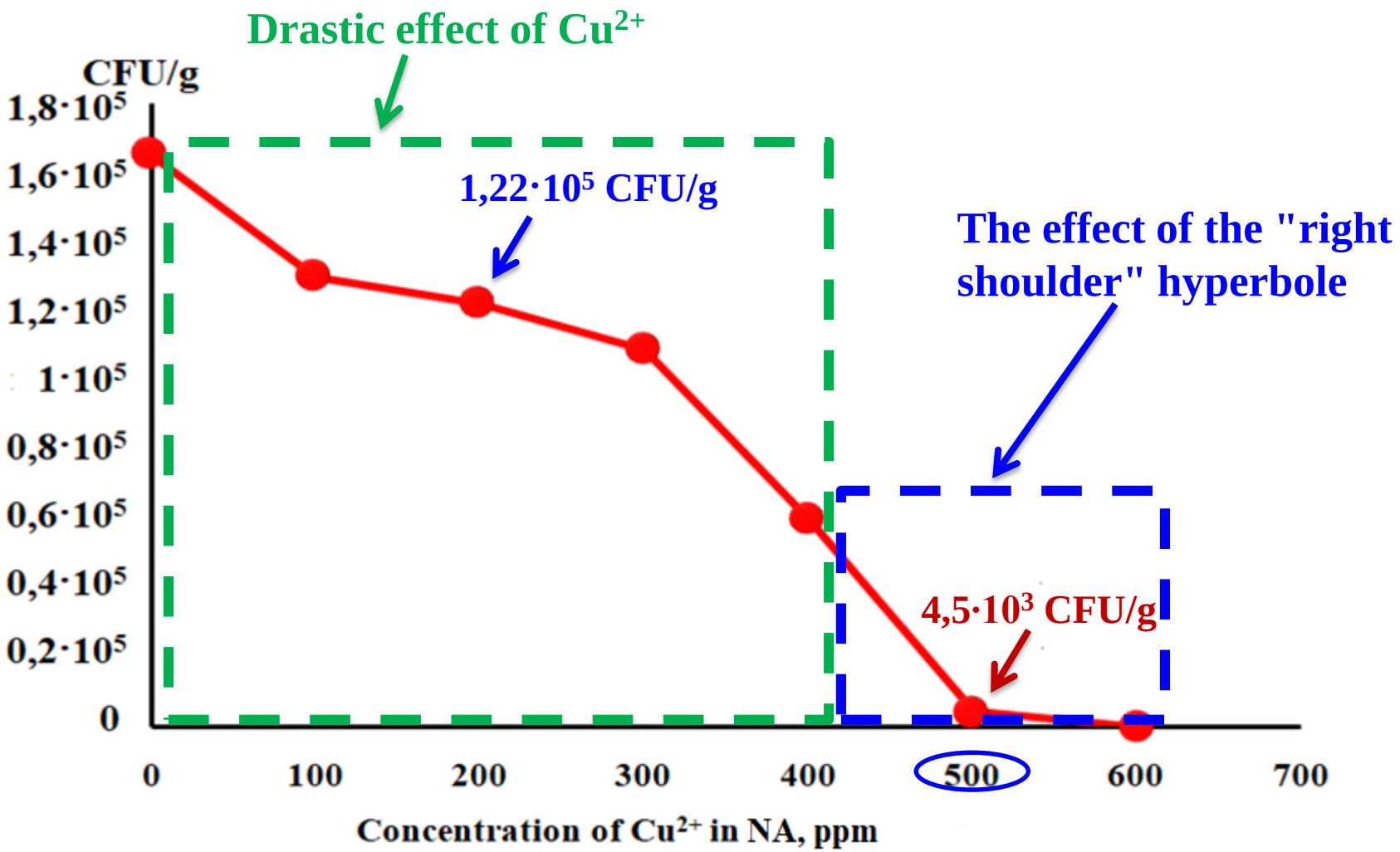
Citrate complex, MPC = 800 ppm Cu^{2+}

MPC – maximum permissible concentration



The resistance of Ecuadorian soil microorganisms to Cu^{2+} ($CuSO_4$)

Cation, MPC = 500 ppm Cu^{2+}



Conclusions

1. **The possibility of high level of microbiome of ecologycally friendly ecosystems adaptation to toxic Cu(II) was experimentally confirmed. The microorganisms resistant to copper(II) in high concentrations - 800 ppm (complex with citrate) and 500 ppm (sulfate form) were present in Ecuador soil.**

2. **The Ecuador soil microbiome was able to interact with Cu(II): to accumulate in cell and to reduce to insoluble $Cu_2O\downarrow$.**

3. **Dependence of the amount of microorganisms on the concentration of copper corresponds to hyperbolic dependence. The right shoulder of hyperbole characterizes the maximum permissible concentration (MPC) of copper for microbial community.**

4. **The suggested approach can be used for prediction adaptation of natural ecosystems microorganisms to toxic extreme factors as well as for development of novel environmental biotechnologies.**


Thanks for
attention