

The QPIX 400 series, more than just Robotic Microbial Colony Pickers with Enhanced Software and New Colony Selection Features

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Overview

Molecular Devices has developed a range of robotic microbial colony picking platforms, providing state-of-the-art automated solutions for genomics, proteomics, industrial microbiology, and biofuels community. The QPix 400 series allow automation of the entire workflow from colony selection to picking, thus leading to reduced timelines and increasing overall productivity. Using the QPix software analysis tools, each colony is interrogated for size, compactness, proximity to neighboring colonies, and even fluorescence intensity. Quantitative identification combined with high accuracy picking, ensures right colony is picked every time with the user defined selection criteria. Furthermore, with the QPIX systems, selection of microbial colonies expressing fluorescent proteins offer the unique option to simultaneously detect colonies and quantify fluorescent markers in a pre-screening step using a combination of white light and fluorescent imaging. In addition, with our new version of QPix software released in January 2014, a new suite of life science tools enables researchers to automate the following applications: e.g., Blue/white bacterial colony selection, Phage-plaque picking, Halo/clearing zone detection, and Custom object creation. With QPIX 400 system and enhanced software features, a broad range of biological applications can be readily automated such as gene/protein expression, directed evolution, enzyme catalysis/evolution, biofuels, phage display, bioenergetics etc.

Introduction

We have developed and validated a new range of microbial colony pickers to meet the greater needs of today's researchers. New features include:

- Selective screening for rare clones using multi-channel fluorescence
- Blue/White colony selection
- Halo / clearing zone detection
- Phage -Plaque detection
- Custom object creation
- New holders for petri-plates
- Automatic agar height sensor
- Data tracking of specific clones through the entire workflow
- Intuitive software to permit use of platforms by anyone in the lab

QPix 400 series

QPix 420



QPix 450



QPix 460



Workflow



Fluorescent imaging on QPix 400 systems

Choice of 2 camera options:

- White light only
- WL + Fluorescence

Filter sets:

- Ultra Violet (377/447)
- Blue (457/536)
- Green (Cy3) (531/593)
- Green (TxRed) (531/624)
- Red (628/692)

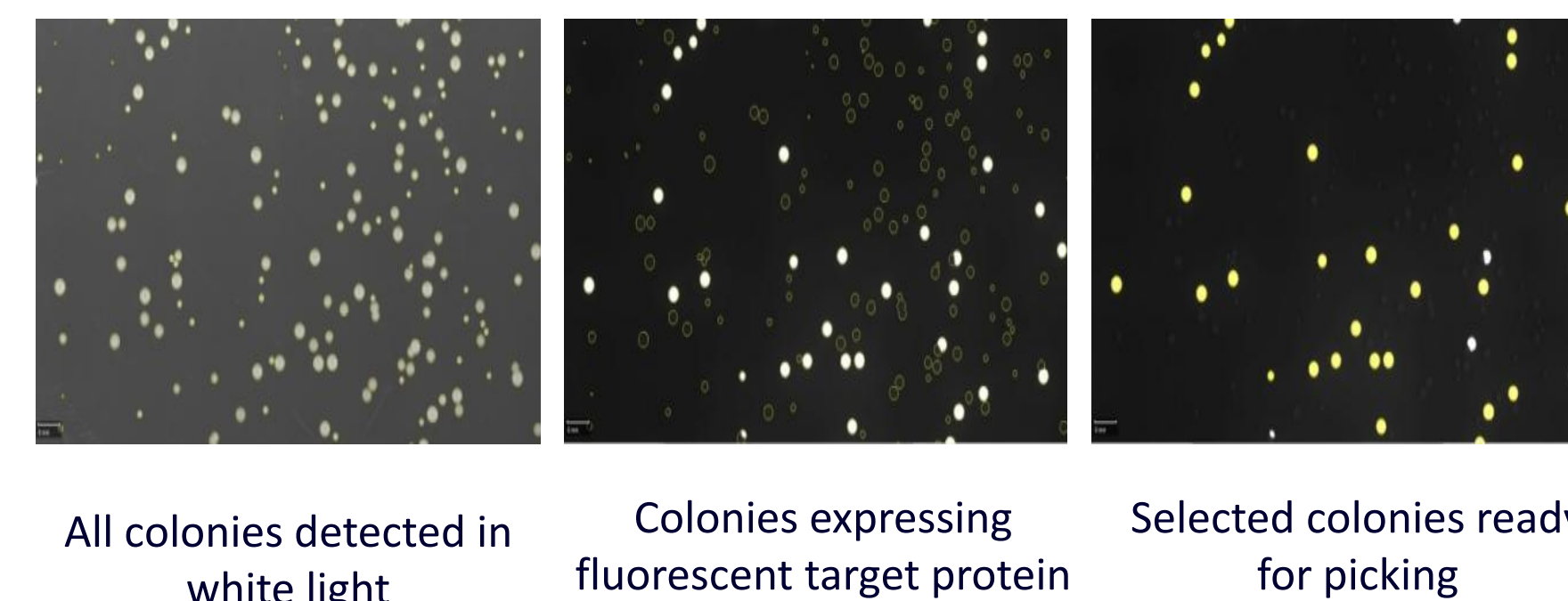
Fluorescent based Colony Selection

Strain Development, Screening, or Stability Analysis

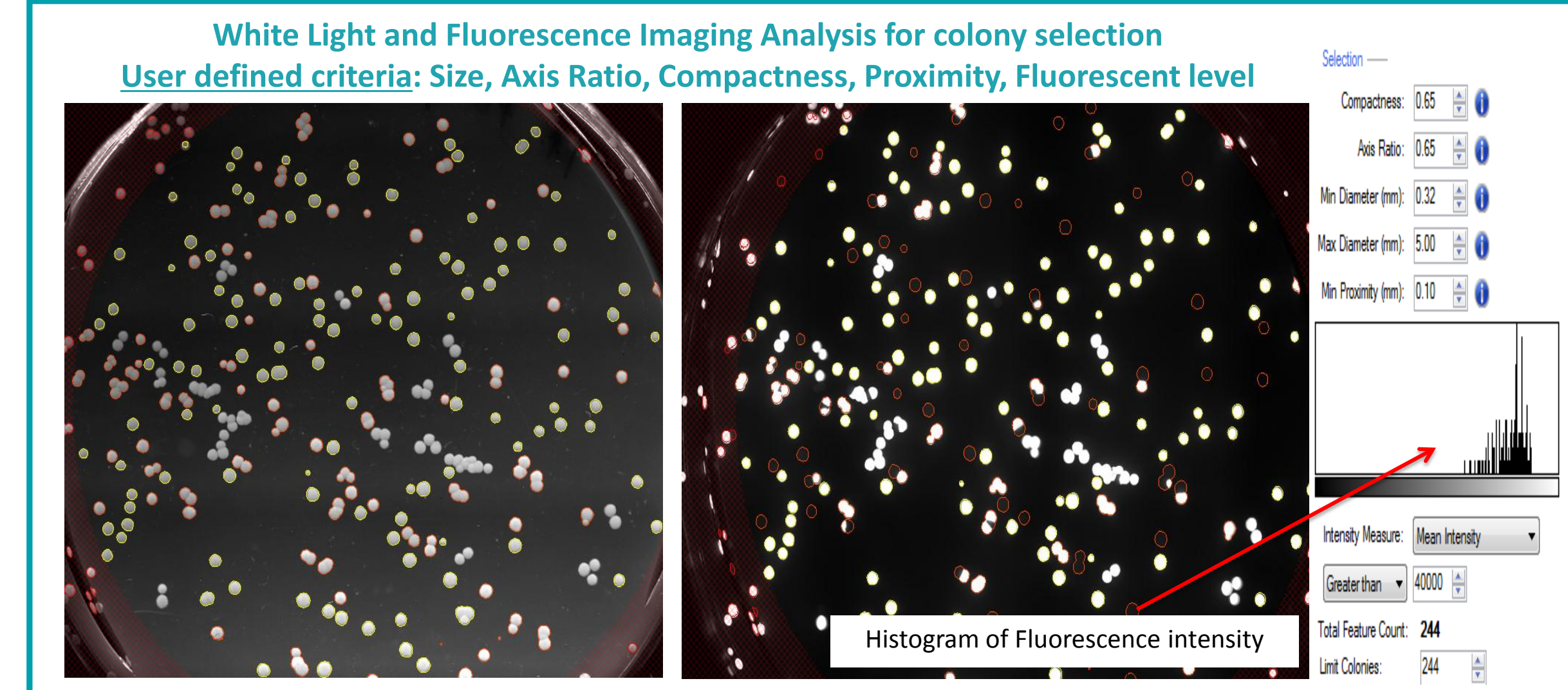
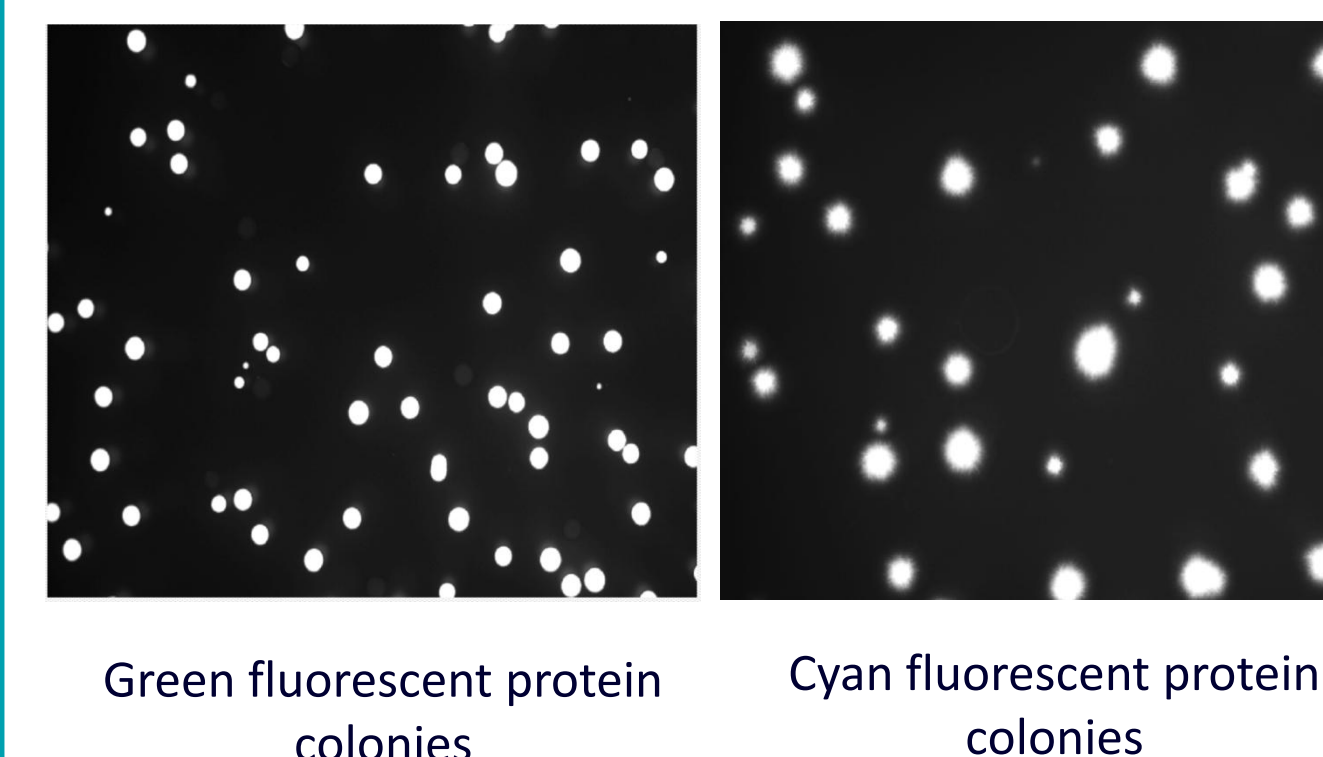
- Pre-screen to identify colonies with optimal protein expression or secretion levels
- Compatible with broad range of fluorescent cloning vectors, e.g. GFP, YFP, CFP etc.
- Use as transformation markers or for mutation screens
- Fuse fluorescent proteins to study protein folding, secretion, enzyme evolution or protein localization
- Maintenance of subsequent clonal integrity during bio-production
- Selectively screen by colony characteristics, e.g. size, shape, proximity, fluorescence intensity

White Light and Fluorescence Imaging

Colony Screening and Analysis



Compatible with a range of fluorescent cloning vectors



QPix 2.0 : New and enhanced QPix software

New applications and enhanced features for colony selection

- Blue white colony selection application
- Halo /clearing zone detection
- Phage – Plaque picking
- Custom Object creation

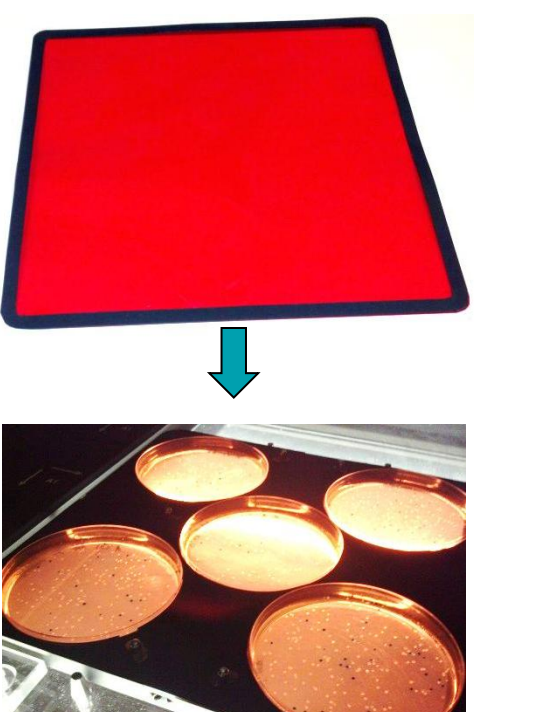
QPix 2.0 : Blue white Colony Selection Application

Blue / White colony screening is a strategy used to visibly distinguish between recombinant and non-recombinant colonies based on the E. coli *lacZ* system.

- Blue White colony selection application is available in QPix 2.0.
- Detection and precise discrimination of blue or white colonies with high confidence.
- White light only application performed using optical filters (QPix Chroma Filters) in combination with threshold intensity (inclusion or exclusion).
- Maturity of the software algorithm allows reliable and efficient selection of powder blue colonies as well, thereby allowing early access for robust picking.

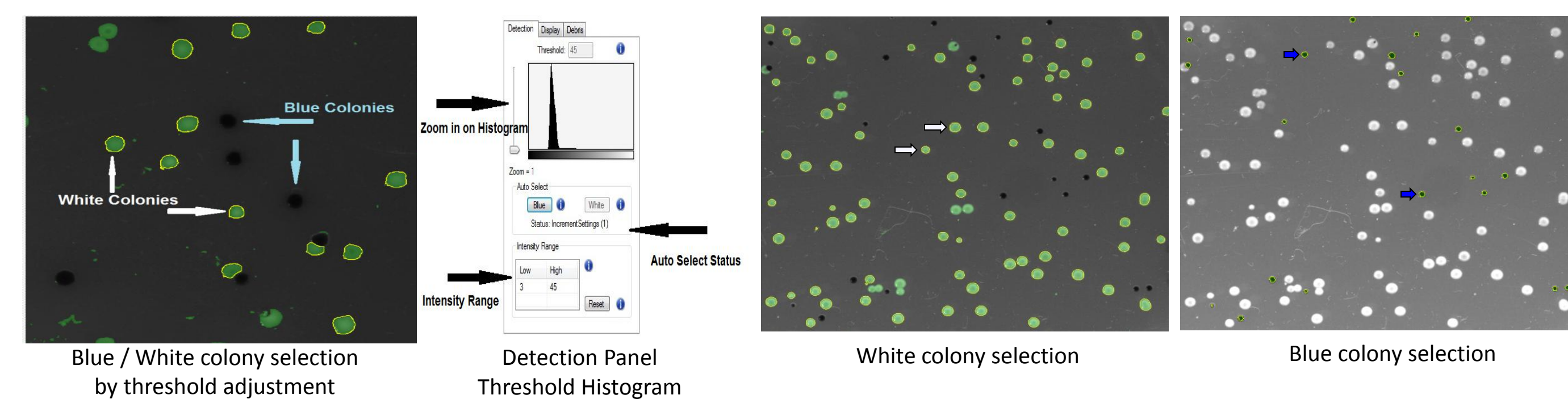
QPix™ Chroma Optical Filter for Blue White Application

- For both blue and white detection, the optical filter improves the recognition of blue or white colonies.
- Reliable discrimination with little or no false positives or false negatives.
- The optical filter - rectangular size of QPix QTray.
- Dimensions of the filter - 22.8 cm square. The outer border is 0.8cm wide all the way around.
- The thickness is 1mm nominal.
- The QPix™ Chroma optical filter is placed on the translucent bed before placing the tray on the system.



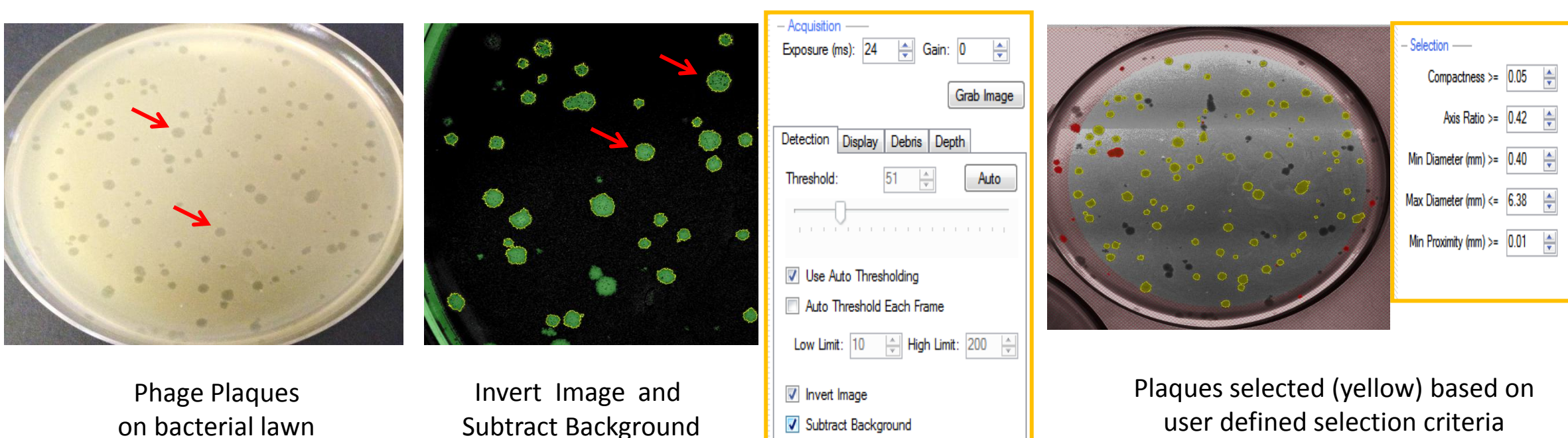
QPix 2.0 : Blue White Colony Selection

Best-in-class software tools can modulate between selection and automated picking of White OR Blue colonies.

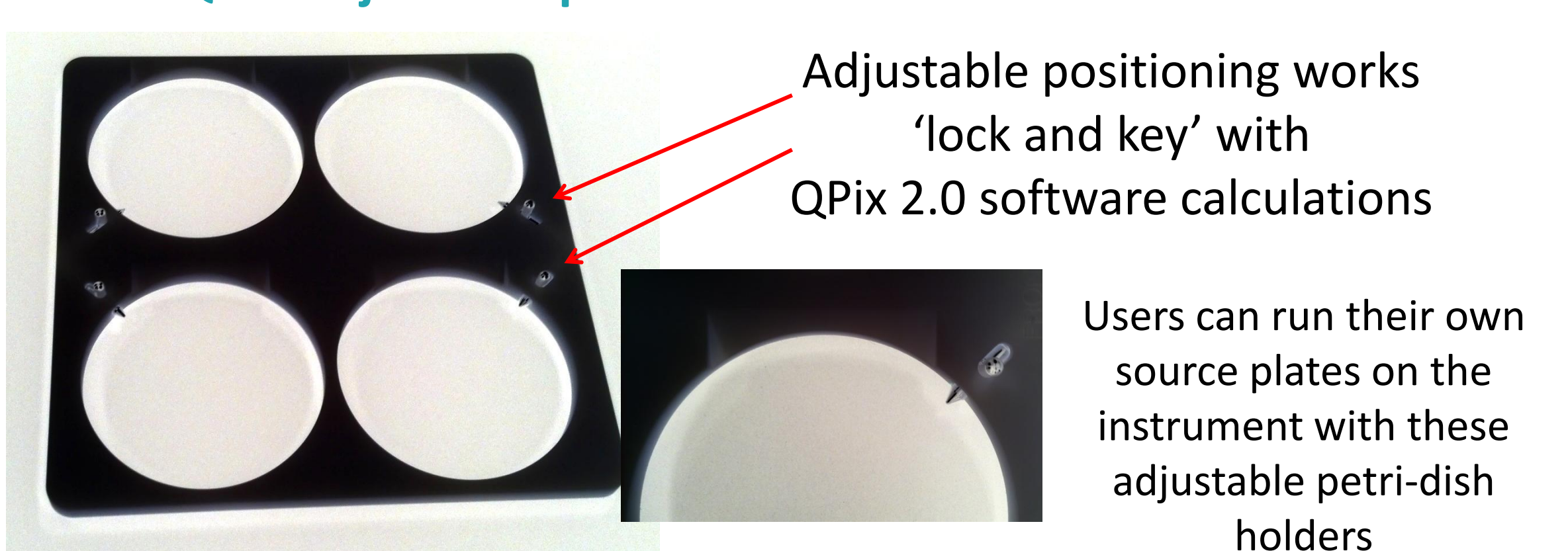


QPix 1.5/2.0 : Phage-Plaque Picking Application

Plaque imaging and selection with invert and background subtraction enabled.

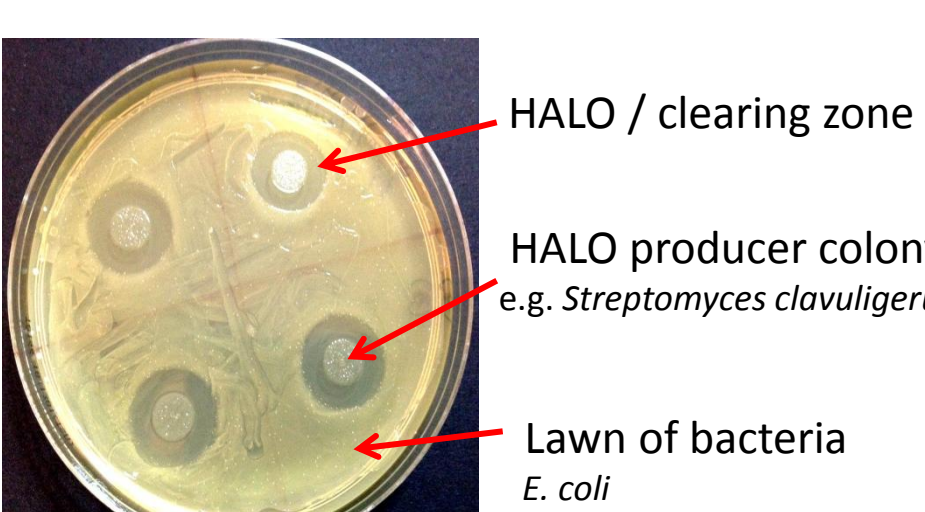


New QPix Adjustable petri dish holders

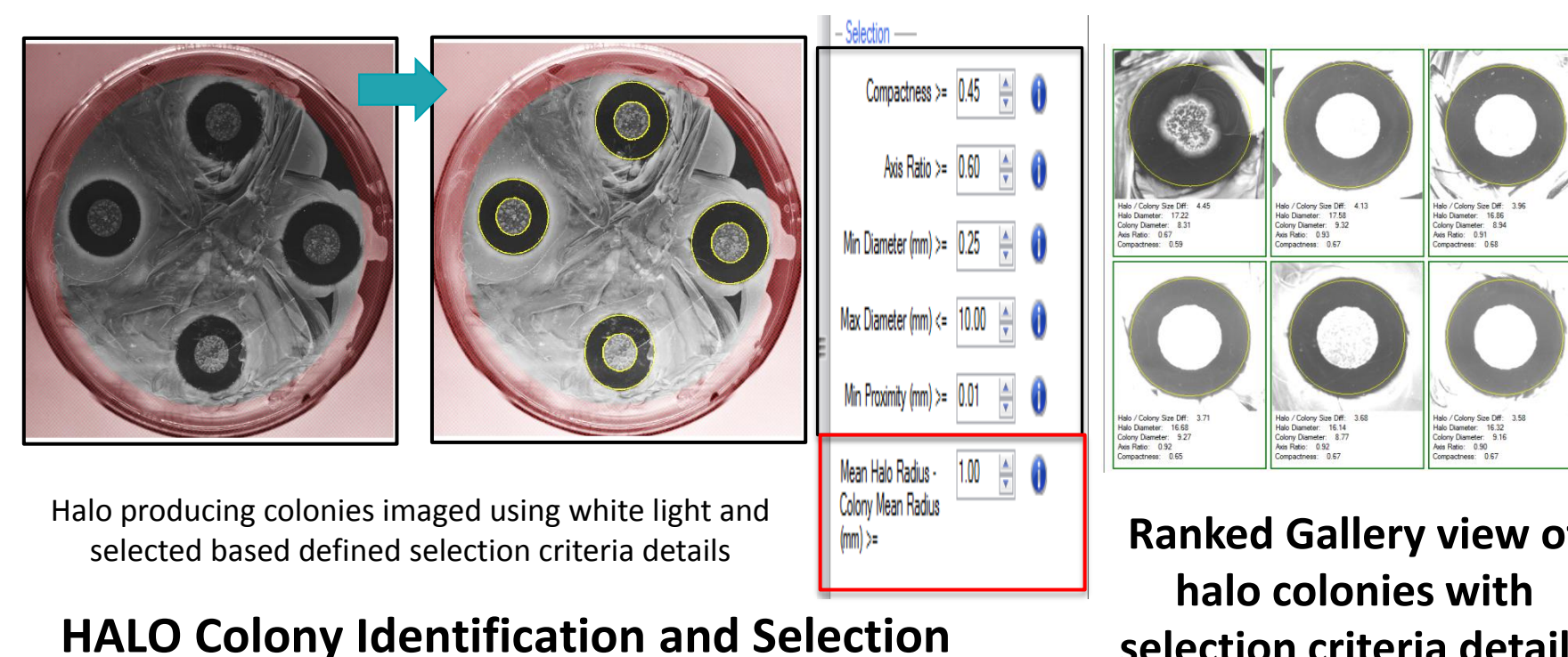


QPix 2.0 : HALO / clearing zone detection application

Clear area within a "lawn" of bacteria where growth does not occur due to an inhibitor (antibiotic) producing colony

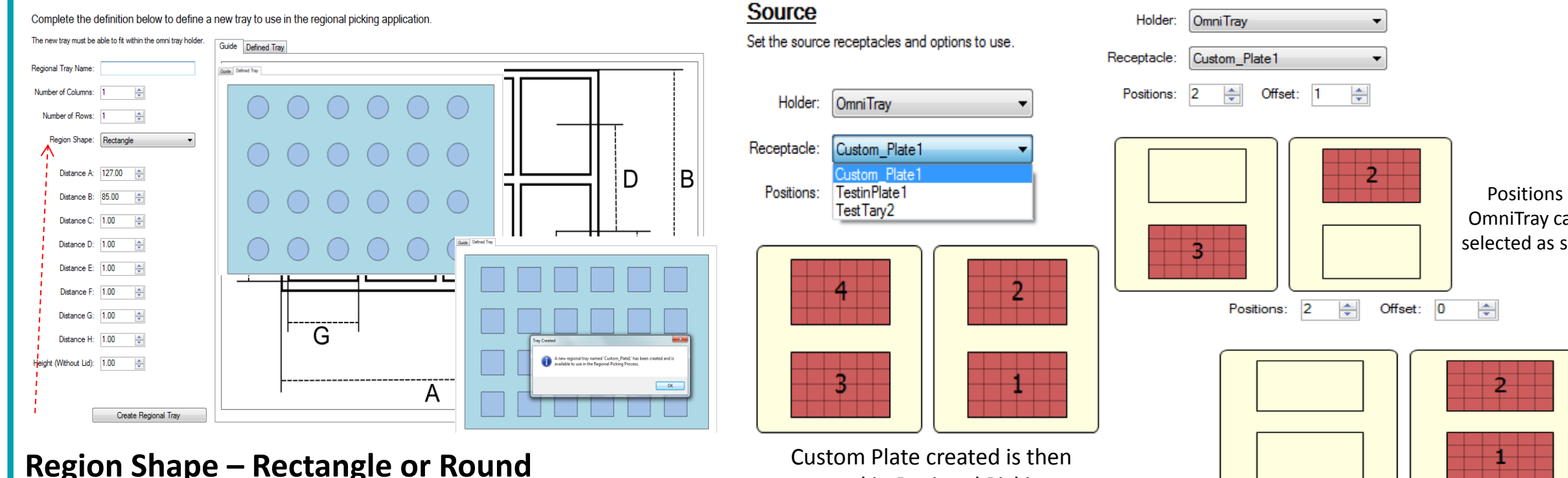


Advanced software algorithms for colony and halo selection based on selection criteria



QPix 2.0 : Custom Object Creation Application

New Regional Tray can be defined and custom created by adding values in the boxes and used in Regional Picking



QPix Applications

- Protein engineering and enzyme evolution
- Protein expression and transformation
- Biofuels and renewable chemicals research
- Phage display
- Metagenomics and Industrial microbiology
- Clone management and library screening

Summary

- World's first range of microbial colony pickers with fluorescence-based screening capability
- QPix 400 series provides automated solutions for each step of the workflow
- New features for colony selection with enhanced software version QPix 2.0
- Designed with intuitive and easy to learn software for use by everyone in the lab