



# Grow Detect AI

**AI-Enabled Digital Quality Control for Scalable Circular Protein  
Production**

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# Bioeconomy Challenge

- Global demand for sustainable protein production is increasing rapidly.
- Industrial insect farming faces challenges in scalability, process variability, and labor-intensive monitoring.
- Lack of digital process intelligence limits production efficiency and consistency.
- AI-driven monitoring systems can support scalable and resource-efficient bioeconomy systems.

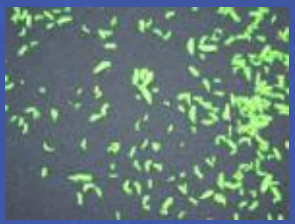
# What is Grow Detect AI?

- Modular AI-based monitoring system for Black Soldier Fly production.
- Uses image analysis for larvae counting, size estimation, and pupal hatching analysis.
- Works with standard smartphone images following image-capture guidelines.
- No expensive or specialized hardware required.
- Analyzes up to 500 larvae per image with >95% detection accuracy.

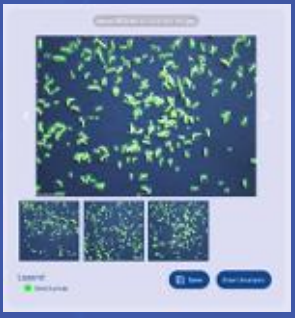
# Key Features



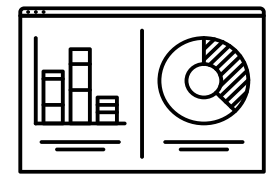
## AI-Analysis



Detection  
Accuracy  
> 95 %



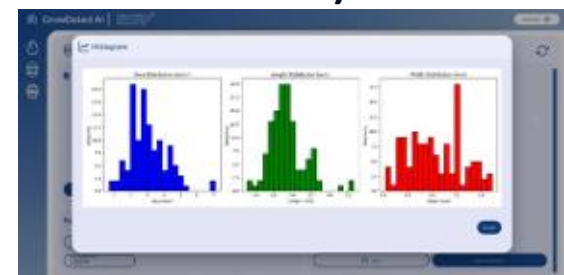
Multiple  
Image  
Processing  
time ~ 5s



## Analysis Result Storage and Analytics



QA Reports & Exports (Excel, CSV)



QA Insights with advanced  
statistical analysis



## Responsive Design



Smartphone  
- Interface



Tablet/PC  
UI

# Feasibility Study

- Pilot study conducted over three BSF production cycles.
- Focus: 5-day old larvae (5 DOL) counting and size estimation.
- Measured KPIs: counting accuracy, labor time, FCR, growth uniformity, and batch variability.
- Operator interviews conducted to evaluate usability and adoption barriers.

# Key Results: Counting Accuracy & Efficiency

- 92% improvement in counting accuracy compared to manual counting.
- Counting error reduced from 19.11% to 3.28%.
- 45% reduction in labor time for counting 500 larvae.
- Monitoring time reduced from 203 seconds to 91 seconds.

# Key Results: Production Performance

- 15% improvement in Feed Conversion Ratio (FCR).
- FCR improved from 1.38 to 1.20.
- Growth uniformity improved significantly.
- Coefficient of variation (CV) reduced from 17% to 6%.
- Batch-to-batch variability reduced by 27%.

# Operational Impact

- Higher confidence in production planning and decision-making.
- Improved process stability and homogeneous larvae development.
- Potential for scalable digital quality control in industrial insect farming.
- Supports sustainable and resource-efficient insect production.

# Challenges & Adoption Barriers

- Personnel training required for transition from manual to software-based workflows.
- Standardized image capture practices are important for optimal performance.
- Future improvements include enhanced size estimation for smaller larvae.

# Conclusion

- Grow Detect AI significantly improves monitoring efficiency and production consistency in BSF farming.
- AI-based monitoring has strong potential for large-scale industrial adoption.
- Digital tools can become key enablers of scalable and sustainable insect production.

Thank you

Questions?