

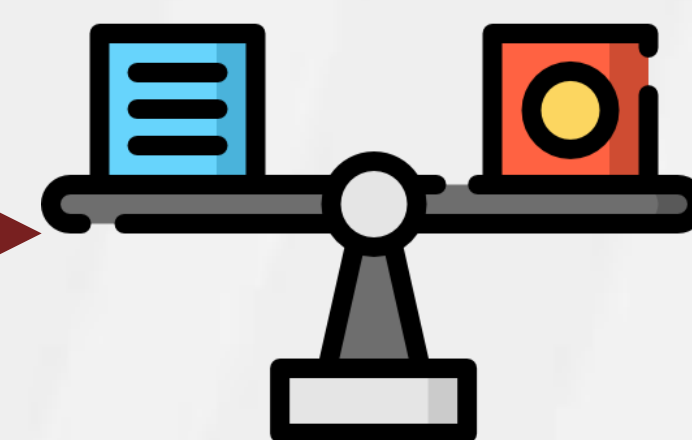
Comparison of performance in avocado pesticide analysis among participants in proficiency trials between 2015-2024

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Introduction

Proficiency testing are performed at participating laboratories to evaluate measurement ability in any measurand of interest quantifying. CENAM being the National Institute that implements the largest number of tests in the country. “Qualitatively and quantitatively pesticides determination in freeze dried avocado” is a proficiency trial that have been developed since 2010 to different laboratories. These proficiency test (PT) are organized following the guidelines of the ISO/IEC FDIS 17043:2023(E) standard and aims to evaluate the performance of the participants to carry out tests or measurements of specific pesticides under previously established criteria, to guarantee the reliability of the results of the analyses carried out on batches of agricultural products intended for commercialization, within the formal national and international markets, in order to reduce rejections at the borders due to the presence of pesticides, resolve international trade disputes and promote the increase of avocado markets both in destinations and products. Its main objective is to contribute to improving the accuracy of laboratory measurements in any analysis field. In México, these test are performed by some laboratories, Is elaborated using a Reference Material of freeze-dried avocado, applicable to all laboratories interested in carrying out measurements corresponding to the quantification of pesticide residues in avocado by gas and/or liquid chromatography with mass spectrometry or a selective detector.

Methodology



Proficiency testing results report's reviews between 2015 and 2024

ζ-value statistic analysis results of: acephate, carbendazim, λ-cyhalothrin, dimethoate, malathion, methamidophos, methyl-parathion and permethrin

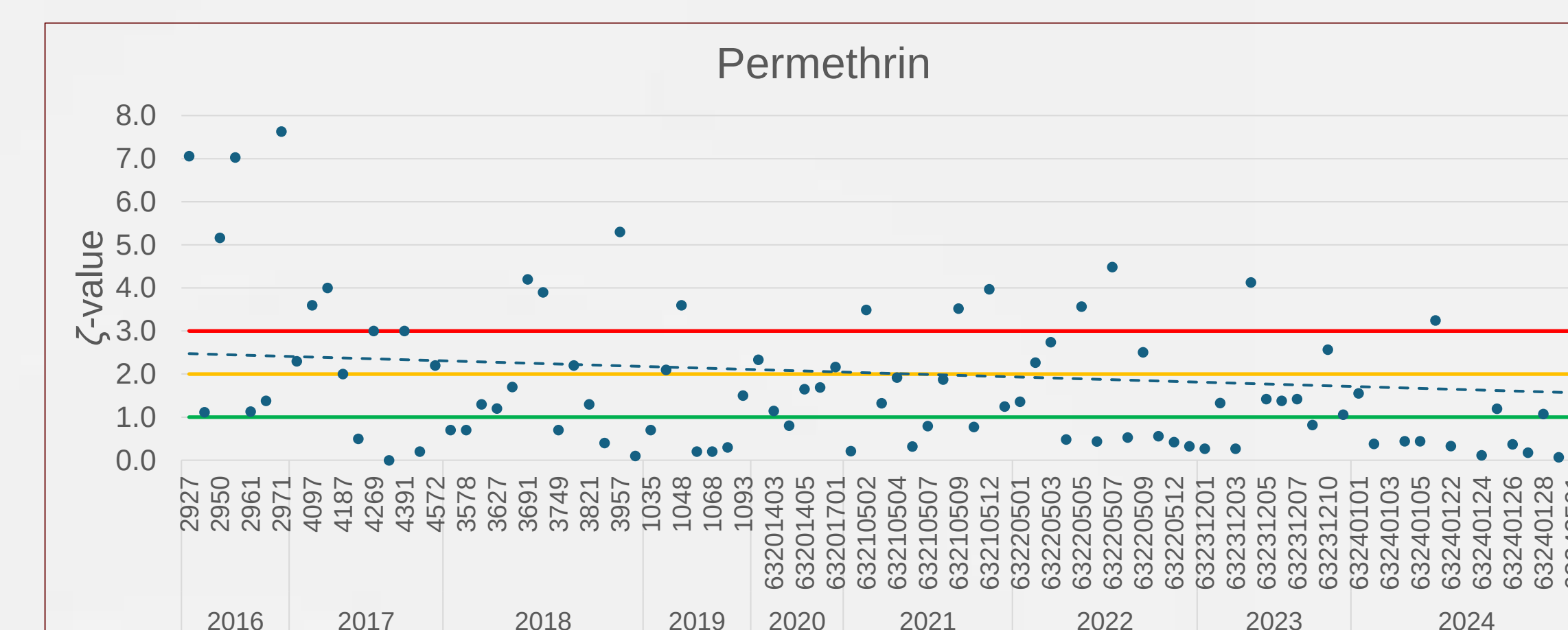
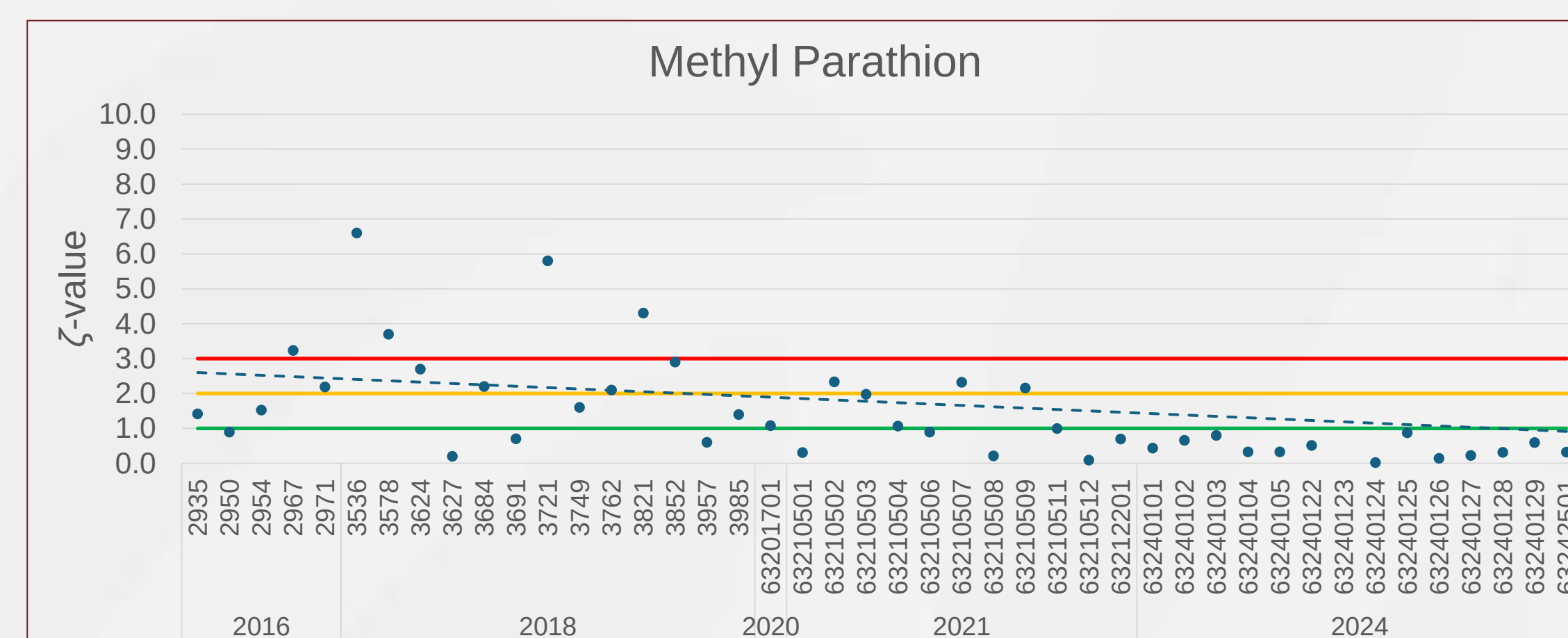
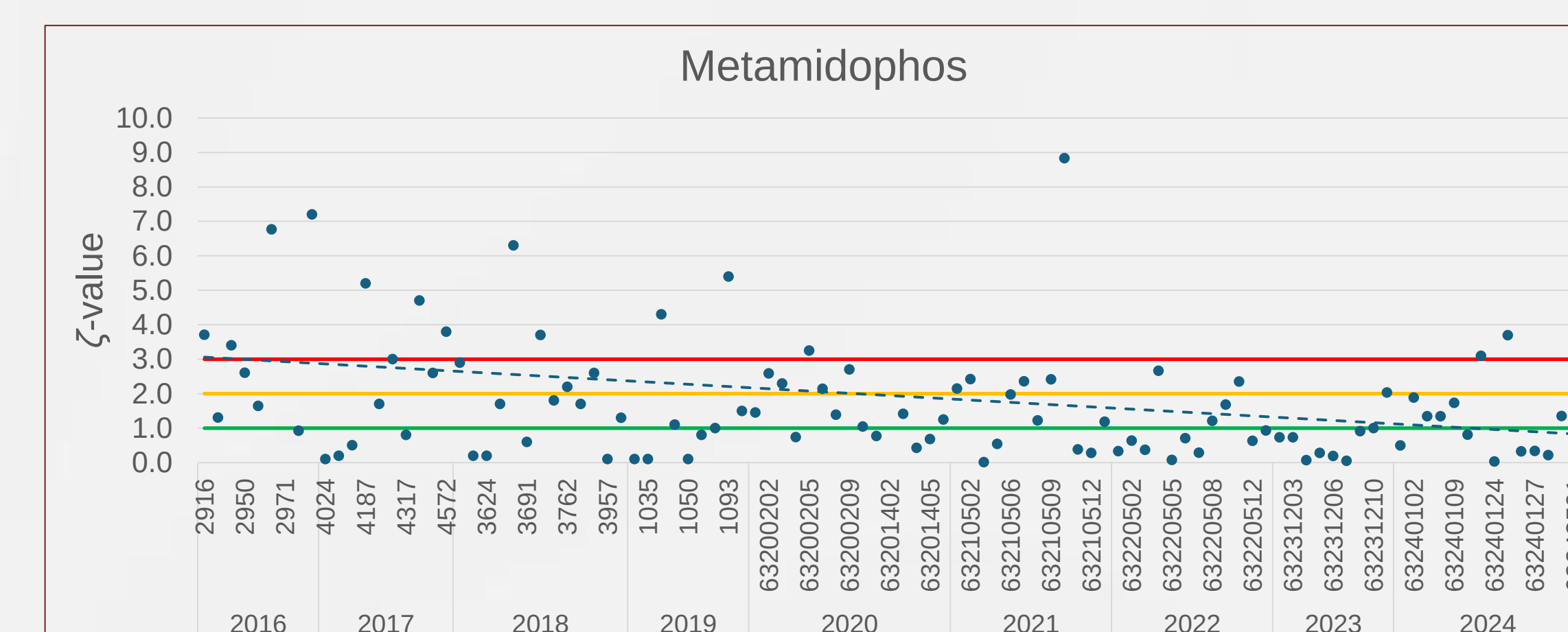
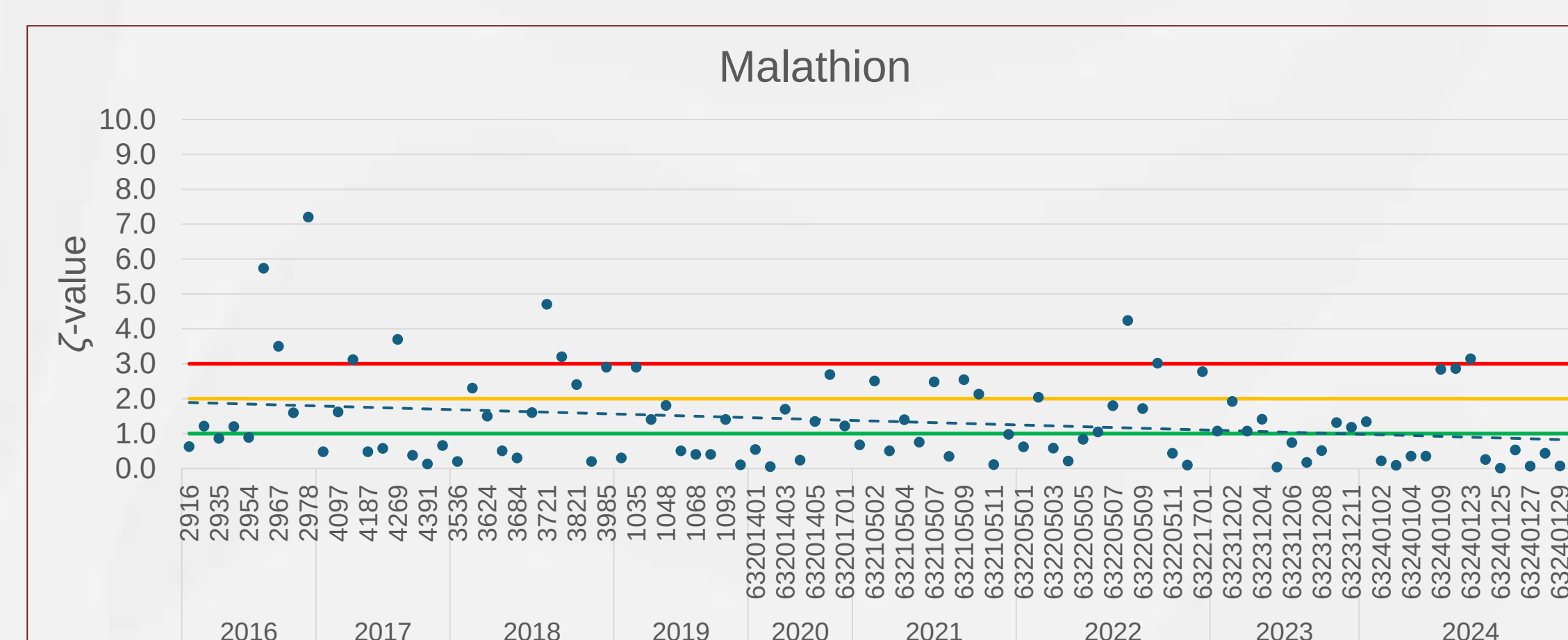
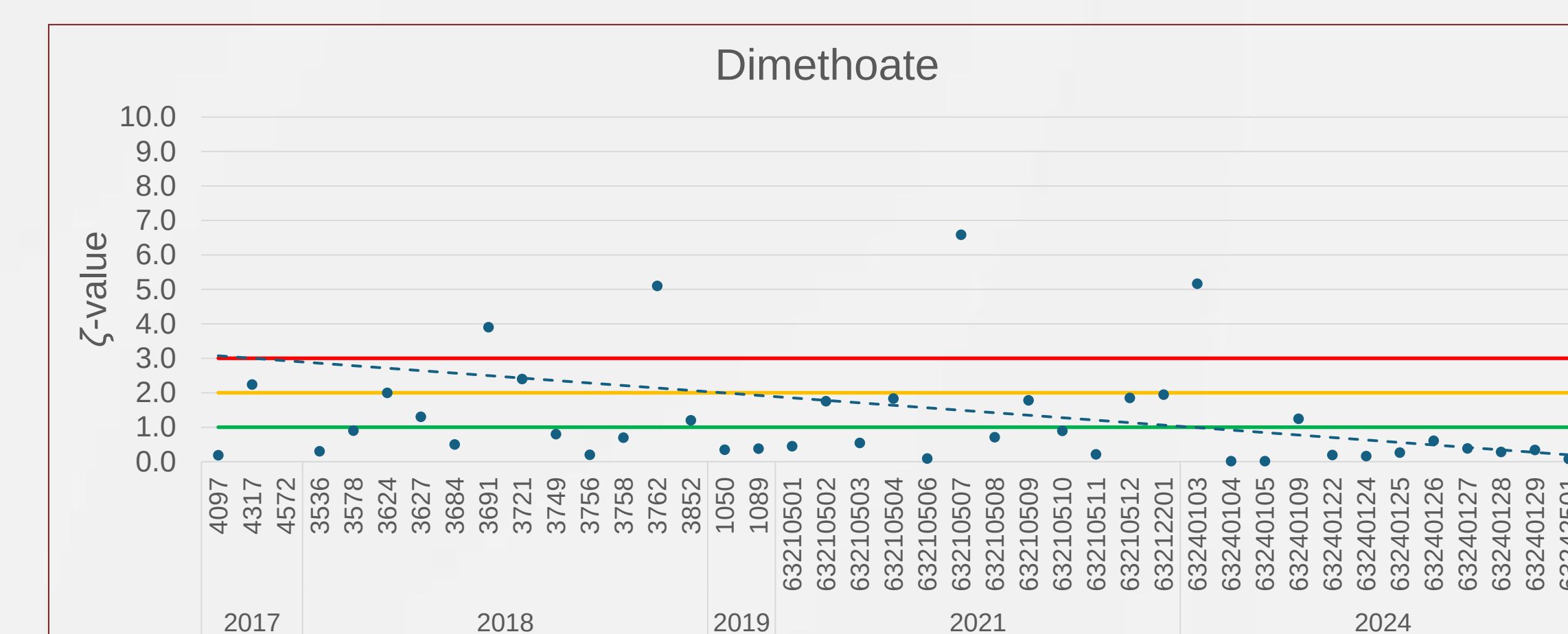
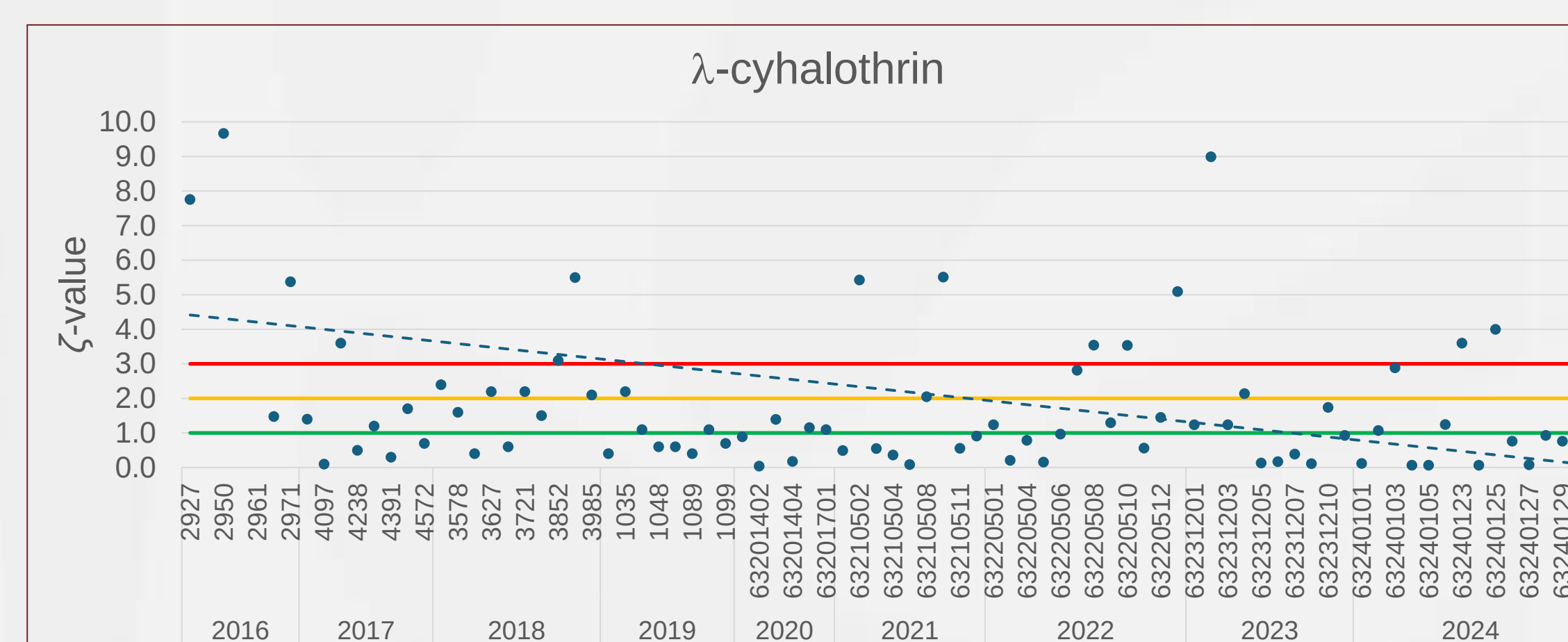
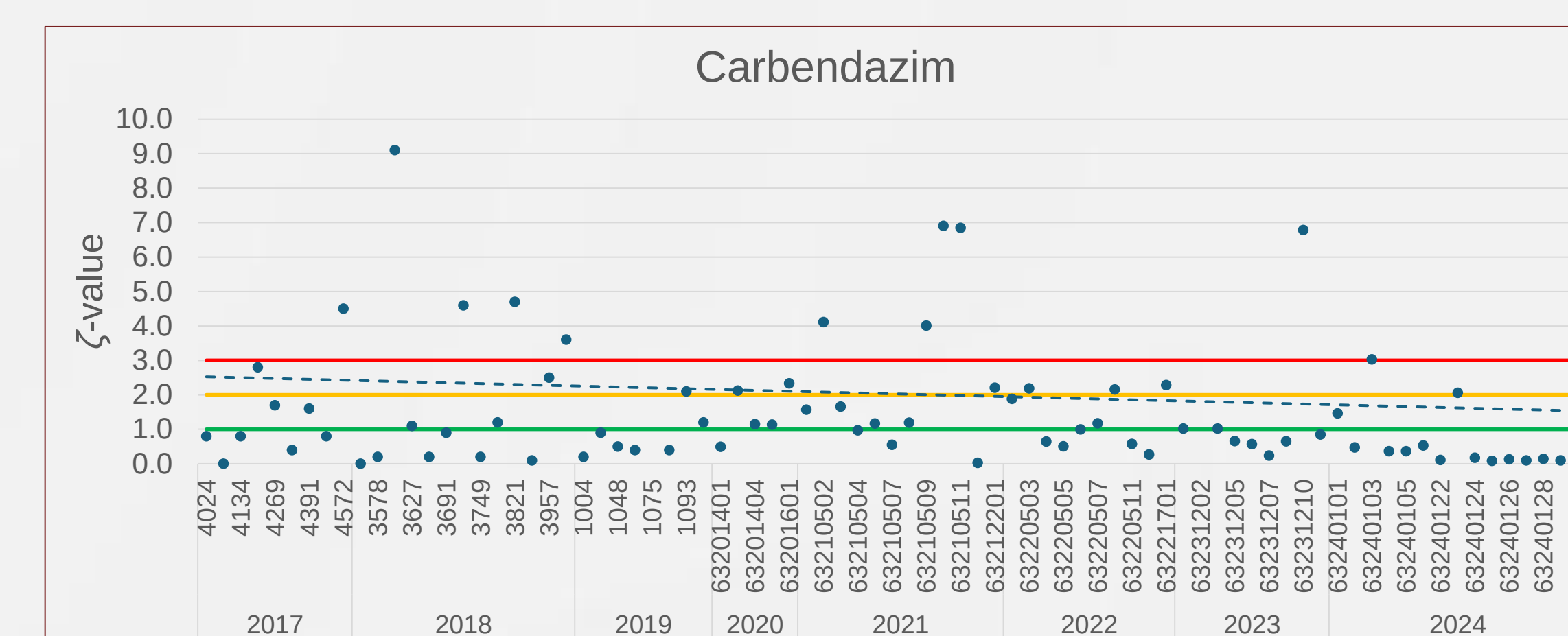
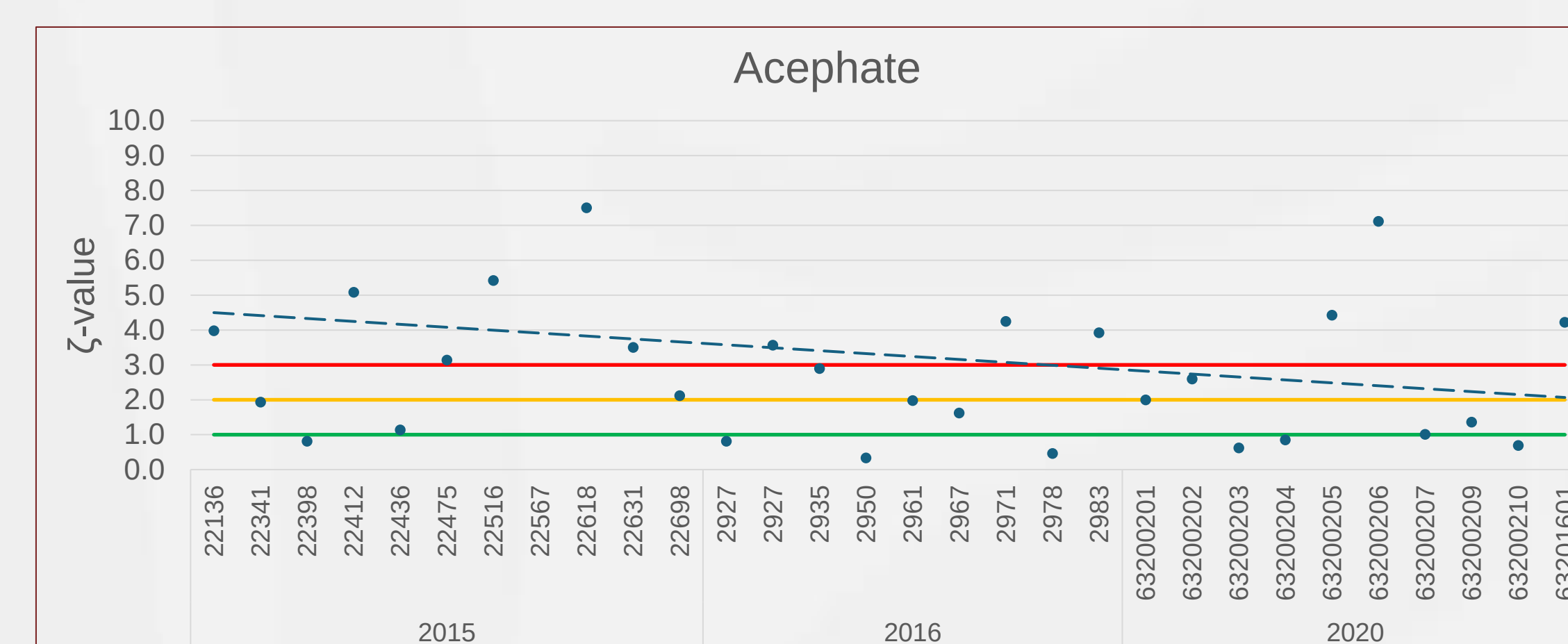
Results comparison

Evaluation criteria $\rightarrow \zeta = \frac{x - X}{\sqrt{u_{lab}^2 + u_{ref}^2}}$

References

- [1] MNC, NMX-EC-17043-IMNC-2010. México DF, 2010,
- [2] CEM, Evaluación de datos de medición. Centro Español de Metrología, 2008
- [3] Eurachem, La Adecuación al Uso de los métodos analíticos. España, 2016.

Results



Conclusion

Over 10-year period, measurement quality improvement between participating laboratories was observed. There is a variability decrease between participant results for each pesticide analyzed within the reference material, specifically for methyl parathion, dimethoate and malathion. In the case of permethrin, λ-cyhalothrin and acephate, a results variability between laboratories is observed, however, a decrease in the trend line is also noted, which indicates that there is also an improvement in the results.