

Dear reviewer,

First of all, we would like to thank you for taking the time and effort to review the manuscript and make valuable recommendations. Below are our responses to your comments.

Comment 1

The manuscript divides the growth stages of chili plants into three classes: Growing, Flowering, and Fruiting. Could the authors elaborate on how these classes were precisely defined and the criteria used to delineate the boundaries between each stage?

Response 1

In this study, plants were examined at the growing (or seedling), flowering and fruiting stages of chili pepper growth, as defined in Ref. [9]; see added sentences in Lines 145–150 in the revision.

Comment 2

The paper states that image augmentation techniques such as mirroring and rotating are employed to expand the training dataset. Could the authors discuss why these specific augmentation methods were preferred over simply increasing the frequency of image collection to obtain more real images? What are the benefits of these synthetic modifications?

Response 2

We used these augmentation methods to increase sample diversity and improve the robustness and generalization ability of the training model. This is generally the most applied approach in such applications.

Our goal here was also to get about 1500 images per class, as suggested in [28].

See added sentences in Lines 211–214 and 229 in the revision.

Rotation makes sense because plants have a natural axis of rotation or radial symmetry.

Comment 3

Were there any preprocessing steps implemented to standardize the images before inputting them into the YOLOv8 models? If so, could you detail these procedures and their impact on model performance?

Response 3

No, apart from downsizing, the images were not changed in this study. In the future (forthcoming papers), image processing procedures such as

- Adjusting the white balance

- Adjusting barrel distortion

will be examined.

Comment 4

What adjustments would be necessary for the proposed model to be effectively applied to other types of plants or different hydroponic setups? Are there particular characteristics of chili plants that might limit the model's applicability?

Response 4

The generalizability of the model to unknown data/other plants/other hydroponic setups was not investigated and will be the subject of further research (forthcoming papers).

The backgrounds of the images could have an influence on the generalizability. For other plant species, separate data sets would have to be created and the model trained. Phenotypic characteristics such as leaf shape, flowers and fruit shape and colour differ from other plant species and could limit the applicability of the model.

Yours sincerely,
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