

BioDCASE 2026 Task 5 Technical Report: Four TrainVal Harmonic Summary Systems

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Abstract

This report describes four submitted systems for BioDCASE 2026 Task 5, Cross-Domain Mosquito Species Classification. All systems use the same TrainVal-trained harmonic summary classifier and differ only in deterministic logit-level calibration at inference time. The submitted prediction files use the official one-based species IDs 1-9. The internal classifier indices are 0-8 and are converted by adding one before writing each TXT file.

Data, features, and classifier

The classifier was trained only on the official TrainVal partition of the released development data. The TrainVal feature matrix contains 244,163 clips. No evaluation labels, no external labelled mosquito recordings, and no manual domain labels from the evaluation set were used. Each clip is represented by a 340-dimensional harmonic summary vector that captures flight-tone-oriented spectral statistics. The classifier is an SGDClassifier with alpha 0.0001, maximum iterations 2000, and random seed 42.

Output format and species mapping

Each TXT file contains one row per released evaluation clip with the header `file_id,predicted_species_id`. The evaluation IDs run from CDMSC2026_EVAL_000001 to CDMSC2026_EVAL_015573. The official Task 5 species IDs are 1 *Aedes aegypti*, 2 *Aedes albopictus*, 3 *Culex quinquefasciatus*, 4 *Anopheles gambiae*, 5 *Anopheles arabiensis*, 6 *Anopheles dirus*, 7 *Culex pipiens*, 8 *Anopheles minimus*, and 9 *Anopheles stephensi*. The learned classifier stores classes internally as 0-8, so every submitted prediction applies `predicted_species_id = internal_class_index + 1`.

Submitted systems

You_PKU_task5_1 (HSbase): Raw classifier argmax. Logit transform: none. Rows changed versus You_PKU_task5_1: 0.

You_PKU_task5_2 (HSsqrt): Argmax after adding a mild square-root inverse TrainVal class-prior bias. Logit transform: logits + 1.0 * centered(-0.5 log TrainVal class prior). Rows changed versus You_PKU_task5_1: 414.

You_PKU_task5_3 (HSprior): Argmax after adding a mild inverse TrainVal class-prior bias. Logit transform: logits + 1.0 * centered(-log TrainVal class prior). Rows changed versus You_PKU_task5_1: 833.

You_PKU_task5_4 (HSmgate): Raw argmax except low-margin clips use stronger inverse-prior calibration. Logit transform: baseline; if top1-top2 margin < 2.0 then logits + 16.0 * centered(-log TrainVal class prior). Rows changed versus You_PKU_task5_1: 1854.

Prediction distribution

Label	1	2	3	4	5	6	7	8	9
You_PKU_task5_1	3522	2241	3662	2754	1413	55	992	837	97
You_PKU_task5_2	3208	2255	3661	2682	1770	56	1003	839	99
You_PKU_task5_3	2903	2260	3652	2592	2155	57	1015	840	99
You_PKU_task5_4	2473	2308	3525	2187	3154	56	929	842	99

Packaging validation

The submission package follows the official example layout: one top-level package folder, one technical report PDF, and one directory per submitted system. Each system directory contains the submitted TXT output and its corresponding meta YAML file. All four TXT files were checked for the exact header, 15,573 rows, unique and ordered file identifiers, and `predicted_species_id` values in the official range 1-9.

Limitations

These four systems do not use a deep ensemble or external labelled mosquito data. Their diversity comes from deterministic class-prior calibration computed from the official TrainVal labels and applied to the same TrainVal-trained harmonic classifier logits.