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COEXISTENCE OF *CEUTORHYNCHUS NAPI* AND *CEUTORHYNCHUS PALLIDACTYLUS* IN OILSEED RAPE: IMPLICATIONS FOR INFESTATION ASSESSMENT AND PLANT DAMAGE EVALUATION

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Abstract. *The stem weevil complex is among the most important groups of insect pests affecting oilseed rape crops, with Ceutorhynchus napi and Ceutorhynchus pallidactylus frequently occurring under field conditions. Since both species are generally monitored using the same trapping tools and are considered together in crop protection practice, their coexistence may influence infestation assessment at both crop and plant level. The aim of this study was to evaluate the coexistence of C. napi and C. pallidactylus in oilseed rape and to assess its implications for infestation assessment and protection measures. The research was conducted in 2025 and 2026, during the period from 27 February to 3 April, in two locations from western Romania, using a semi-early hybrid. The methodology included adult monitoring with yellow traps, manual plant assessments using a metric frame, and species identification with portable and digital microscopy. One experimental place was assessed under untreated conditions, while the second was monitored under phytosanitary protection. The originality of the study lies in documenting the frequent coexistence of the two species under practical crop conditions and in relating this coexistence to the localization of plant damage. The results showed a slight dominance of C. pallidactylus in yellow-trap captures in both years, while co-infested plants represented 64.8% of the total assessed material. The most frequent symptom recorded at plant level was splitting towards the stem base, whereas galleries in petioles and damage in secondary branches were less frequent. Mean larval presence associated with C. napi was consistently higher than that recorded for C. pallidactylus, indicating a more persistent internal stem attack. Although adult captures declined strongly in the treated place after insecticide application, coexistence remained evident in both places and in both years. The results highlight the need to combine trap monitoring with direct plant assessment for a more accurate interpretation of stem weevil infestation in oilseed rape.*

Keywords*: oilseed rape, stem weevils, Ceutorhynchus napi, Ceutorhynchus pallidactylus, coexistence, co-infestation, yellow traps, plant damage*

INTRODUCTION

Oilseed rape (*Brassica napus L.*) is one of the most important field crops cultivated in Europe, due to its role in vegetable oil production and its value within crop rotation systems. Its productivity is strongly influenced by pest pressure, especially during spring, when several insect species colonize the crop and affect stem development and further plant growth. Among these, *Ceutorhynchus napi* and *Ceutorhynchus pallidactylus* are considered among the most important stem weevils associated with winter oilseed rape in Europe (MENZLER-HOKKANEN ET AL., 2006; WILLIAMS, 2004; GROZEA, 2015; OBERMEIER ET AL., 2022).

In field practice, the two species are generally approached together because adult migration is monitored using the same yellow traps and both are included in the stem weevil complex relevant for crop protection decisions. At the same time, practical entomological guides also emphasize the importance of correct pest recognition and field evaluation in order to support crop protection decisions (PĂLĂGEȘIU ET AL., 2000; GROZEA, 2015). However, previous studies have shown that the two species differ in flight dynamics, oviposition behaviour, and localization of larval feeding inside the plant. *C. pallidactylus* is mainly associated with petioles and secondary branches, whereas *C. napi* is more closely related to injuries in the main stem, including splitting towards the base of the stem and more persistent larval presence inside stem tissues (ŠEDIVÝ AND VAŠÁK, 2002; FERGUSON ET AL., 2003; SEIDENGLANZ ET AL., 2022).

The coexistence of the two species under field conditions may complicate infestation assessment, especially when both are recorded in the same crop and their symptoms overlap. This issue is relevant in applied agricultural research because adult abundance in traps does not always correspond directly to the type and severity of plant damage (Milovac et al., 2017). Studies have shown that the two species may occur simultaneously in oilseed rape and may even interact at plant level, which makes the interpretation of infestation more difficult when they are treated only as a single pest complex (DECHERT AND ULBER, 2004; EICKERMANN ET AL., 2015; EICKERMANN ET AL., 2020).

Under these conditions, a better understanding of the coexistence of *C. napi* and *C. pallidactylus* is necessary for a more accurate field evaluation of infestation and for a more correct interpretation of protection measures in oilseed rape. Therefore, the aim of the present study was to assess the coexistence of the two species in oilseed rape crops from western Romania and to evaluate its implications for infestation assessment and protection measures under treated and untreated field conditions.

MATERIAL AND METHODS

The study was conducted in 2025 and 2026, between 27 February and 3 April, in two oilseed rape crops from western Romania, cultivated with the semi-early hybrid Appolonia. For data presentation, the two sites were coded as Place 1 and Place 2. Place 1 was monitored under untreated conditions, whereas Place 2 was investigated under phytosanitary protection (Table 1).

Adult monitoring was carried out with yellow traps, using four traps per location, read at 7-day intervals. The number of *C. napi* and *C. pallidactylus* adults was recorded for each sampling date. The practical warning threshold considered in the study was 10 adults/trap for three consecutive days.

Table 1

Experimental design and observation scheme

Experimental factor	Description
Study period	2025 and 2026, 27 February – 3 April
Crop	Oilseed rape hybrid Appolonia
Experimental coding	Place 1 = untreated; Place 2 = treated
Yellow traps	4 traps / place; readings at 7-day intervals
Plant assessments	6 frame-based evaluations; 3 replications; 10 sampling points; 40–43 plants / m²
Species identification	Portable microscope in the field and digital microscope in the Entomology Laboratory (USVT)
Recorded indicators	Adult abundance in traps, infestation frequency, co-infestation, galleries in petioles, damage in secondary branches, splitting towards stem base, larval presence in stems
Protection measures	Inazuma and Delmetros in Place 2; drones used for crop monitoring and treatment application only in Place 2

Plant assessments were performed manually with a metric frame, through six frame-based evaluations in each crop, using three replications and ten sampling points. Depending on crop density, 40–43 plants per m² were analyzed. General crop monitoring was performed in the field, while in Place 2 drones were additionally used for crop surveillance and treatment application.

Species identification was performed with a portable microscope in the field and confirmed in the laboratory using a digital microscope in the Entomology Laboratory of USVT. The recorded indicators included adult abundance in traps, infestation frequency at plant level, co-infestation rate, galleries in petioles, damage in secondary branches, splitting towards the stem base, and larval presence inside the stem. In Place 2, insecticide treatments with Inazuma and Delmetros were applied, while Place 1 remained untreated (Table 1).

The abundance in the 3 irrigation systems and the identification of potential food sources and breeding habitats were the indicators we followed.

Figure 1. Species identification in the field and laboratory: (a) adult of *C. pallidactylus* on shoots; (b) assessment of stems for larval attack (*C. napi*); (c) evaluation of indicators per m² in the untreated crop; (d) detailed examination of trap-captured adults (of *C. napi*) and larvae collected from stems

The identification of the specimens found was carried out through macroscopic studies directly in the habitat but also through detail (Figure 1), under the binocular magnifying glass at Phytosanitary Diagnostic and Expertise Laboratory within the ULST.

RESULTS AND DISCUSSION

The seasonal monitoring carried out with yellow traps confirmed the presence of both *Ceutorhynchus napi* and C. *pallidactylus* in both study years and in both experimental places. As shown in Table 2, the total seasonal captures were consistently higher in Place 1 than in Place 2. In 2025, Place 1 recorded 144 adults of *C. napi* and 165 adults of *C. pallidactylus*, compared with 61 and 69 adults, respectively, in Place 2.

Table 2

Seasonal summary of adult captures of *C. napi* and *C. pallidactylus* in yellow traps

Year	Place	Total C. napi	Total *C. pallidactylus*	Mean *C. napi* /reading	Mean *C. pallidactylus* /reading	Peak *C. napi*(adults/trap)	Peak *C. pallidactylus* (adults/trap)
2025	Place 1	144	165	14.4	16.5	24	26
2025	Place 2	61	69	6.1	6.9	17	15
2026	Place 1	156	158	15.6	15.8	26	31
2026	Place 2	62	69	6.2	6.9	16	15

Note: In all year × place combinations, C. pallidactylus represented the slightly dominant species in adult captures (50.3–53.4% of the seasonal total)

A similar situation was observed in 2026, when Place 1 reached 156 adults of *C. napi* and 158 adults of *C. pallidactylus*, whereas Place 2 recorded 62 and 69 adults, respectively. The mean number of adults per reading was also clearly higher in Place 1, reaching 30.9 adults/trap in 2025 and 31.4 adults/trap in 2026, compared with only 13.0 and 13.1 adults/trap in Place 2 (Table 2). These values indicate a higher seasonal pressure of stem weevils in Place 1.

The dynamics of adult captures during 2025 are illustrated in Figure 2. Both species showed a gradual increase in abundance from the end of February to the second half of March, followed by a decline towards the beginning of April. In Place 1, peak values reached 24 adults/trap for *C. napi* and 26 adults/trap for *C. pallidactylus*, while in Place 2 the maximum values were lower, namely 17 adults/trap for C. napi and 15 adults/trap for *C. pallidactylus*. The same general pattern was maintained in 2026, as shown in Figure 2, with maximum values of 26 adults/trap for C. napi and 31 adults/trap for *C. pallidactylus* in Place 1, compared with 16 and 15 adults/trap, respectively, in Place 2.

The comparative values presented in Table 2 also show that C. *pallidactylus* was slightly dominant in trap captures in all year × place combinations. Its share in total captures ranged from 50.3% to 53.4%, while the share of *C. napi* ranged from 46.6% to 49.7%.

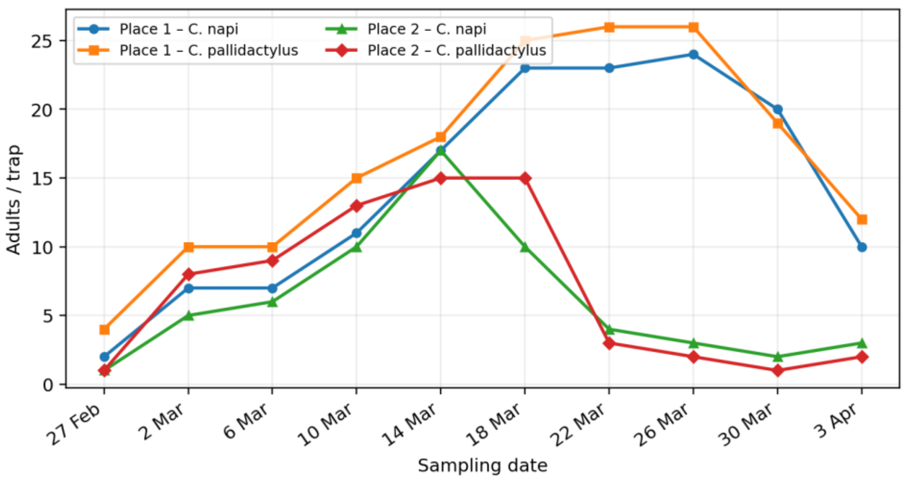

Figure 2. Seasonal dynamics of adult captures in 2025. The figure shows the weekly evolution of *C. napi* and *C. pallidactylus* in Place 1 and Place 2 from 27 February to 3 April; adult abundance increased progressively until mid–late March, with consistently higher values in Place 1

This slight predominance is also visible in Figures 1 and 2, where the *C. pallidactylus* curves generally remained above or close to those of *C. napi*, especially during the peak period. However, the difference between the two species was relatively small, which supports their practical interpretation as components of the same stem weevil complex rather than as two completely separate infestation events.

A relevant aspect highlighted by Figures 2 and 3 is the stronger reduction of adult captures in Place 2 after the critical period. After mid-March, the number of adults trapped in Place 2 declined rapidly in both years and remained low until the last reading, whereas in Place 1 the captures remained higher for a longer interval. This pattern is consistent with the phytosanitary protection applied in Place 2 and suggests that adult activity was reduced under treated conditions. Nevertheless, the treated place continued to record the presence of both species, which indicates that treatment influenced abundance but did not eliminate species coexistence from the crop.

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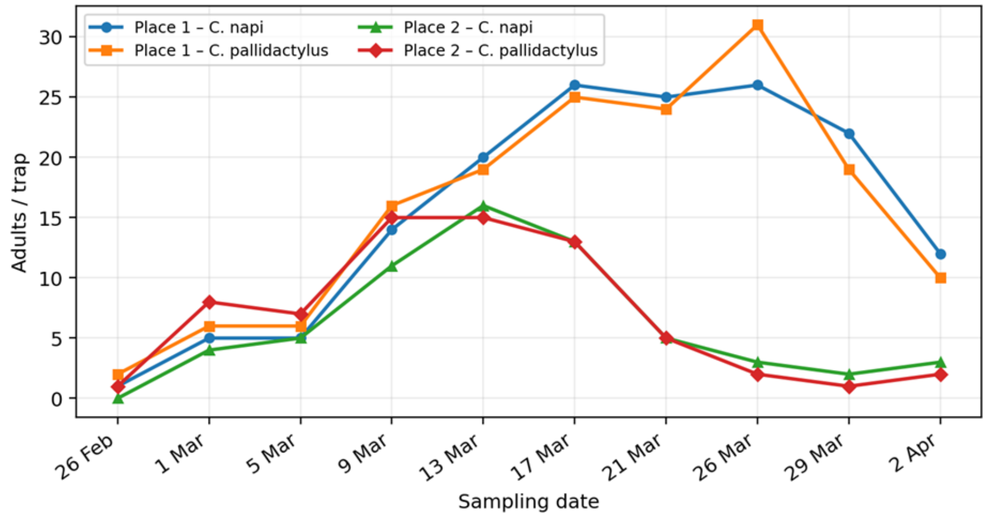

Figure 3. Seasonal dynamics of adult captures in 2026. The two species followed a similar seasonal pattern, with peak values recorded in mid and late March; trap catches remained markedly lower in Place 2 after treatment.

The frequency of infestation at plant level is presented in Table 3 and, in percentage form, in Table 4. These data clearly show that co-infestation was the dominant category in all experimental variants. In 2025, co-infested plants represented 27 out of 41 plants in Place 1 and 29 out of 43 plants in Place 2. In 2026, 25 out of 40 plants were co-infested in Place 1 and 26 out of 41 in Place 2. Overall, 107 of the 165 assessed plants were co-infested, representing 64.8% of the total analyzed material (Table 3). By comparison, plants infested only with *C. napi* accounted for 9.1%, plants infested only with *C. pallidactylus* for only 2.4%, and non-infested plants for 23.6% (Table 3).

Table 3

Frequency of infestation and co-infestation at plant level (number of plants and share within each sample)

Year	Place	Total assessed plants	Only C. napi (no.; %)	Only C. pallidactylus (no.; %)	Co-infested plants (no.; %)	Non-infested plants (no.; %)
2025	Place 1	41	4; 9.8	2; 4.9	27; 65.9	8; 19.5
2025	Place 2	43	4; 9.3	0; 0.0	29; 67.4	10; 23.3
2026	Place 1	40	3; 7.5	2; 5.0	25; 62.5	10; 25.0
2026	Place 2	41	4; 9.8	0; 0.0	26; 63.4	11; 26.8
Overall	Both places	165	15; 9.1	4; 2.4	107; 64.8	39; 23.6

Statistical remark: co-infested plants represented 64.8% of all assessed plants, compared with 9.1% for plants infested only with C. napi and 2.4% for plants infested only with C. pallidactylus

The dominance of the co-infested category is also evident in Figure 4, where the share of co-infested plants is clearly higher than that of the other infestation categories in both places and both years. The percentage values ranged from 62.5% to 67.4%, showing a relatively stable coexistence pattern. In contrast, the category "only *C. pallidactylus*" remained very low and was even absent in Place 2 in both years (Table 3, Figure 4).

This suggests that, under the studied conditions, the two species occurred predominantly together at plant level. From a practical perspective, these results indicate that infestation in oilseed rape should be interpreted mainly as a mixed process involving both species rather than as isolated attacks produced by each species separately.

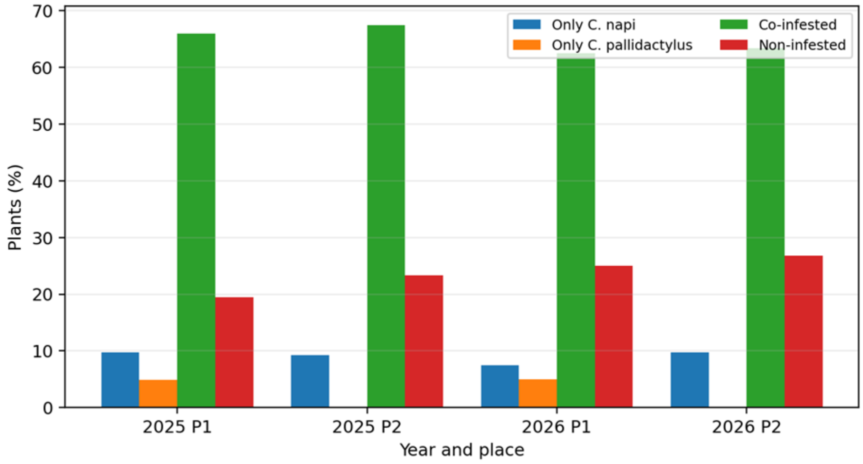

Figure 4. Share of infestation categories at plant level. Co-infested plants were dominant in all year × place combinations, ranging between 62.5% and 67.4%, while plants infested only with C. pallidactylus remained rare.

The localization of plant damage is summarized in Table 4 and illustrated comparatively in Figure 5. The most frequent symptom recorded in all experimental variants was splitting towards the stem base, with values ranging from 24 to 26 affected plants. In 2025, this symptom was observed in 25 plants in Place 1 and 26 plants in Place 2, while in 2026 it was recorded in 24 plants in both places (Table 4). In Figure 4, splitting towards the stem base clearly appears as the dominant symptom compared with galleries in petioles and damage in secondary branches.

Table 4

Type and localization of plant damage associated with the stem weevil complex

Year	Place	Galleries in petioles	Damage in secondary branches	Splitting towards stem base	Mean larvae visible inside stem / C. napi	Mean larvae visible inside stem and petiole / C. pallidactylus
2025	Place 1	4	2	25	28.5	4.5
2025	Place 2	4	3	26	32.0	6.5
2026	Place 1	4	2	24	28.5	4.0
2026	Place 2	5	1	24	30.5	5.0

Note: values for larval presence are expressed as mean values per stem in the total assessed plants, according to the field records

The other damage indicators were recorded at much lower frequencies. Galleries in petioles ranged from 4 to 5 plants, and damage in secondary branches varied between 1 and 3

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plants, depending on year and place (Table 4, Figure 5). This distribution of symptoms suggests that the visible field expression of infestation was concentrated mainly in the main stem rather than in petioles or secondary branches. At the same time, the values recorded for galleries in petioles and branch damage indicate that *C. pallidactylus* was also present in the damage complex, but with a less dominant contribution to the main visible symptomatology.

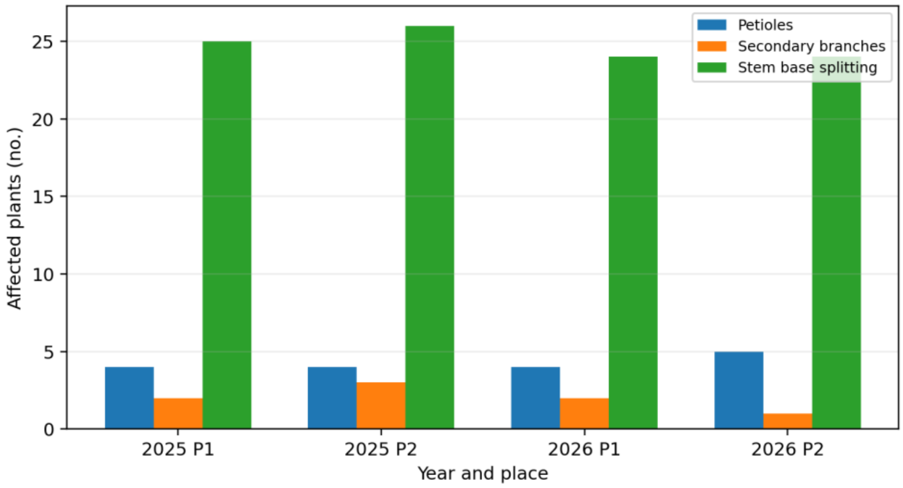

Figure 5. Main damage symptoms associated with stem weevil infestation. Stem-base splitting was the dominant symptom in all experimental variants, while galleries in petioles and damage in secondary branches were recorded at lower frequencies

Additional support for this interpretation is provided by the mean larval presence values included in Table 4. The mean values associated with C. napi ranged from 28.5 to 32.0, while those associated with *C. pallidactylus* ranged only between 4.0 and 6.5. Thus, even though *C. pallidactylus* was slightly more abundant in adult captures, *C. napi* showed a much stronger association with persistent internal stem attack. This difference is important because it shows that the abundance of adults in yellow traps did not translate directly into the same level of internal stem injury.

Taken together, Table 2, Table 4, and Figures 2, 3, and 5 show that the slight dominance of *C. pallidactylus* in adult monitoring was not mirrored by a higher severity of stem-base injury. On the contrary, the strongest and most persistent internal damage was associated with *C. napi*. This means that trap catches alone are not sufficient for a complete interpretation of infestation and must be complemented by direct plant assessments. Under field conditions, the coexistence of the two species complicates the relationship between adult abundance and visible plant symptoms, especially when both species are present on the same plants.

The comparison between Place 1 and Place 2 further supports the agronomic relevance of the obtained results. Although Place 2 showed lower trap captures after treatment, the percentages of co-infested plants remained high in both years, as shown in Table 3 and Figure 4. Therefore, phytosanitary protection reduced adult abundance but did not alter the general coexistence pattern observed at plant level. This finding indicates that the simultaneous presence of *C. napi* and *C. pallidactylus* should be considered in field evaluation regardless of whether the crop is treated or untreated.

Overall, the data presented in Tables 2–4 and Figures 2-5 show that *C. napi* and *C. pallidactylus* should be interpreted in oilseed rape as a frequently coexisting stem weevil complex. Their coexistence was consistent in both years and both places, while plant damage evaluation showed that splitting towards the stem base was the dominant visible symptom and that persistent internal stem attack was more strongly associated with *C. napi*. Consequently, a correct assessment of stem weevil infestation in oilseed rape requires the combined interpretation of trap monitoring, plant infestation frequency, and localization of damage.

CONCLUSIONS

Both *Ceutorhynchus napi* and *C. pallidactylus* were recorded in both years and in both experimental places, confirming the stable presence of the stem weevil complex in oilseed rape. Adult captures were higher in Place 1, while *C. pallidactylus* was slightly dominant in trap catches.

At plant level, coexistence was the main infestation pattern, with co-infested plants representing 64.8% of the assessed material. The dominant visible symptom was splitting towards the stem base, whereas galleries in petioles and damage in secondary branches were less frequent.

Although *C. pallidactylus* was slightly more abundant in yellow traps, *C. napi* was more strongly associated with persistent internal stem attack. These results show that trap monitoring should be complemented by direct plant assessment for a more accurate evaluation of stem weevil infestation in oilseed rape.

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