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Description of *Perrissinoides cerambycivora* gen. et sp. nov.
(Diptera : Tachinidae)

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Summary

Perrissinoides cerambycivora gen. et sp. nov., an internal parasite of the larvae of certain species of Cerambycidae (Coleoptera) is described on larval, pupal and adult characters. The host larva is killed in its pupal cell, where the parasite larva pupates. The adult parasite emerges through a weakened exit area prepared either by the host or the parasite larva. A parasitised larva is easily recognised by the conspicuous respiratory horn of the parasite on the host's first abdominal or metathoracic segment. Adult parasites emerge from October to March, hosts from December to April (based on laboratory rearing).

INTRODUCTION

In this paper a new genus is erected for a species of Tachinidae which has been reared from the larvae of *Gastrosarus* sp. (probably *nigricollis* Bates), *Didymocantha sublineata* White and *D. quadriguttata* Sharp (Coleoptera: Cerambycidae, subfam.: Cerambycinae). *Perrissinoides cerambycivora* gen. et sp. nov., on Mesnil's classification (1944) belongs to the Larvaevorini of the subfamily Larvaevorinae. As the eyes are hairy, the facial keel is relatively undeveloped, and the parafacials are somewhat narrowed ventrally, this species fits better in the Larvaevorinae than in the Ameninae of Mesnil.

In Malloch's key (1938) to the New Zealand Tachinidae, *Perrissinoides* keys out near to *Perrissina* Malloch, from which genus *Perrissinoides* differs in its possession of a presutural intra-alar seta. Other New Zealand genera which possess this seta are *Genotrichia* Malloch, *Uclesiella* Malloch, *Plagiomyia* Curran, *Ctenophorocera* Brauer and Bergestamm (= *Cerosomyia* Hutton) (Mesnil, 1950), *Calcageria* Curran, *Calcager* Hutton. These genera have the beret nude, while in *Perrissinoides* the beret has one long and one short setula on the anterior half.

In the first part of the generic description, special emphasis is laid on the condition of the beret (of van Emden, 1954 = barett of Mesnil), which is an oblong, oblique plate lying between the ventral margin of the pteropleuron and

the dorsal margin of the hypopleuron, extending from the metathoracic spiracle to the posterior dorsal corner of the sternopleuron. This structure is often called the infraepimeron and is regarded as a division of the epimeron; the larger dorsal part (ptero-pleuron) is often called the supraepimeron (Snodgrass, 1935). Other important characters are the distance between the eyes across the vertex, the presence of the presutural intra-alar seta, and the size of the genital segments (A6-10). In Figs. 13-15, the condition of the abdominal segments 6, 7 and 8 are shown for *Perrissina*, *Perrissinoides* and *Calcager*. While the degree of fusion between tergites 6 and 7 is seen to vary, tergites 7 and 8 always appear fused. Examination was restricted to mature adult material, and so no idea of the pattern of sclerotin area formation was gained. Examination of the adult material suggested that A7 is bounded from 8 by a ridge or slight discontinuity in the sclerotised area; the A7 spiracle is either anterior to, or on this boundary. In the description below, the tergites of A7 and A8 are regarded as fused, and written as A7 + 8.

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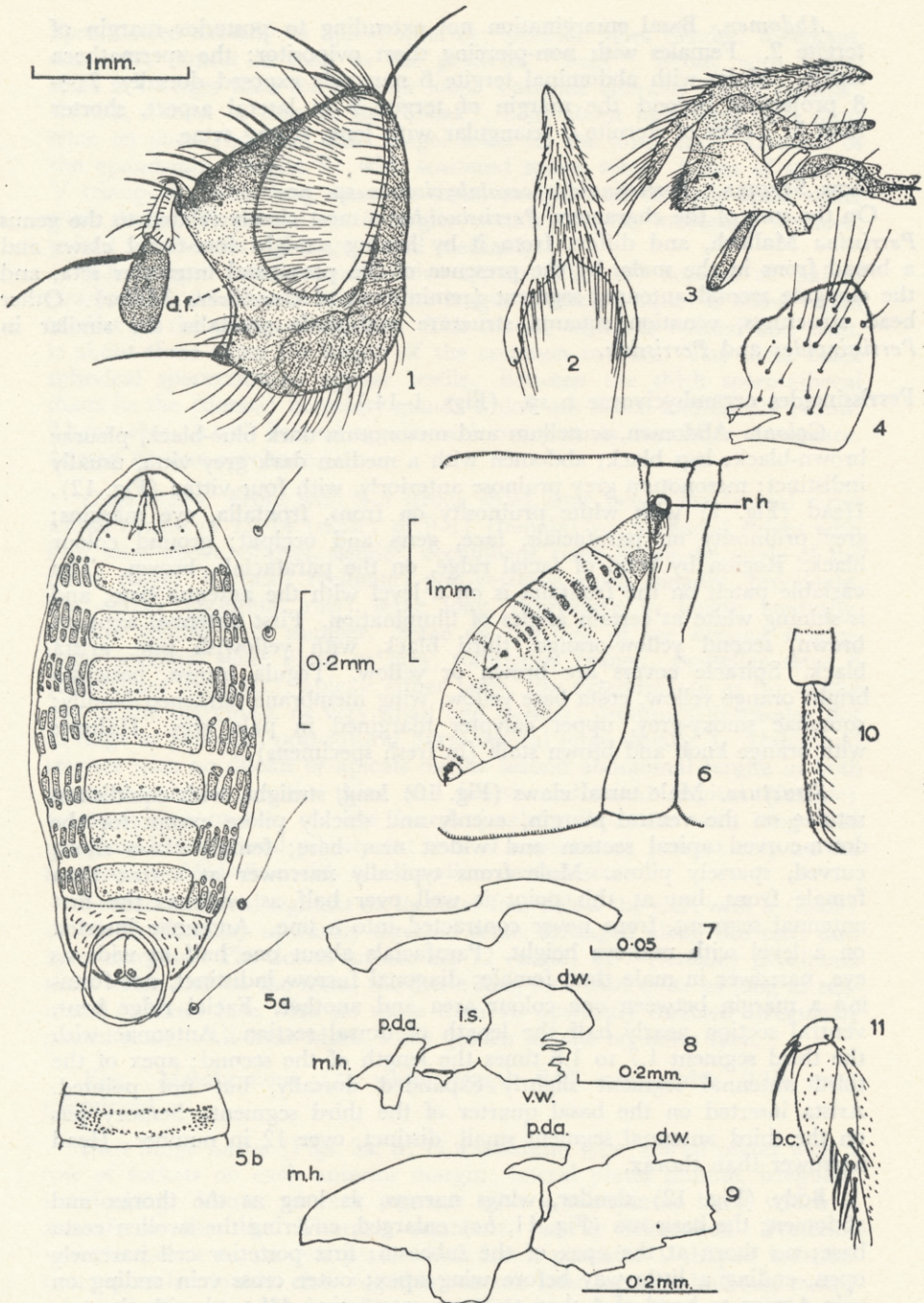
Genitalia are described using terms advanced in Tuxen (1956).

Perrissinoides n. gen.

Body slender, rather than calliphorid; the presutural intra-alar seta well-developed, the beret minutely pilose with an anterior long fine setula, and sometimes an additional shorter fine setula; no discal setae on abdominal tergites 2, 3 or 4, or if present on 4, then as one fine pair only; no apical marginal setae on tergite 2; male fore tarsal outer claw straight, as long as the 5th tarsal segment, evenly pilose.

Head. Eyes haired, except for the posterior third; parafacials nude, half as wide as eye at narrowest point, gena ("occipital dilation" of Mesnil) under half eye-height in height; face shallowly bifoveolate, carina broad, visible in lateral aspect; facialia nude above a point level with the basal corner of the eye; third antennal segment less than twice as long as second; basal and mid-aristal segments subequal, globose; third segment thickened for half its length, minutely hairy. Frontal setae extending to the antennal insertion; frontalia with a fine setulose orbital series, proclinate. Male with proclinate orbital seta absent, female with 2 proclinate setae; reclinate inner orbital seta present in female only. Ocellars proclinate, strong; inner verticals reclinate, strong; post-verticals setulose, proclinate. Vibrissae strong, inserted on a level with or a little above the oral margin. Epistome slightly projecting. Frons flat at vertex; eyes in male separated by a distance equal to the width of the third antennal segment.

Thorax. Presutural intra-alar seta as strong as post-sutural dorso-centrals. Post-sutural DCs in 3, rarely 4, pairs; acrostichals 4 + 4; scutellum with basal, marginal, fine discal and apical setae, apicals variable—sometimes fine and short, sometimes half length of marginals. Scutellar setae often asymmetrical. Two long setae at base of pteropleuron. Mid tibia with sub-median ventral seta; hind tibia with a ventral apical spine. Wings with setulae on base of vein 3; first posterior cell narrowly open, ending on costa before apex. Ultimate section of vein 5 as a spur.



TEXT-FIG. 1 (Figs. 1-11).—(*Perrissinoides cerambycivorae* n. sp.) Fig. 1—Head of male in lateral view (d.f., diagonal furrows). Fig. 2—Male valvulae mediales in dorsal view. Fig. 3—Male hypopygium in lateral view. Fig. 4—Right half of lobe of sternite V. Fig. 5a—1st stage larva, dorsal view in situ under the skin of the host. Fig. 5b—1st stage larva, ventral view of the fourth abd. segment showing pattern of scobinations. Fig. 6—Second stage larva in situ in host (rh, respiratory horn). Fig. 7—1st stage larva: pharyngeal skeleton in lateral view. Fig. 8—Second stage larva: pharyngeal skeleton in lateral view. Fig. 9—Third stage larva: pharyngeal skeleton in lateral view. (dw, dorsal wings; is, intermediate sclerite; m.h., mandibular hooks; p.d.a., poster dorsal angle of the m. hooks; vw, ventral wings). Fig. 10—Outer tarsal claw, left foreleg of male. Fig. 11—Base of the costa with the enlarged basicosta (bc).

Abdomen. Basal emargination not extending to posterior margin of tergite 2. Females with non-piercing short ovipositor; the spermatheca sessile. Males with abdominal tergite 6 narrowly exposed dorsally, 7 + 8 projecting beyond the margin of tergite 5 in lateral aspect, shorter than 5. Lobes of sternite 5 triangular with long, strong setae.

TYPE SPECIES. *Perrissinoides cerambycivora* sp. nov.

On the sum of the characters, *Perrissinoides* is most closely related to the genus *Perrissina* Malloch, and differs from it by having straight fore-tarsal claws and a broad frons in the male, by the presence of the presutural intra-alar seta, and the elongate second antennal segment (reminiscent of *Gracilicera* Miller). Other head structures, venation squama structure and male genitalia are similar in *Perrissinoides* and *Perrissina*.

Perrissinoides cerambycivora n. sp. (Figs. 1–14.)

Colour. Abdomen, scutellum and mesonotum dark blue-black, pleurae brown-black; legs black; abdomen with a median dark grey vitta, usually indistinct; mesonotum grey pruinose anteriorly, with four vittae (Fig. 12). Head (Fig. 1) with white pruinosity on frons, frontalia, eye margins; grey pruinosity on parafacials, face, gena and occiput; ground colour black. Region by bend of facial ridge, on the parafacials, brown. The variable patch on the frontalia is on a level with the antenna base, and is shining white at certain angles of illumination. First antennal segment brown, second yellow-orange, third black, with yellowish pile, arista black. Spiracle covers are brown or yellow. Tegula brown, basicosta bright orange yellow, costa base yellow, wing membrane darkened basally; squamae smoky-grey, upper calypter margined in pale grey. Halteres with orange knob and brown stalk (in fresh specimens).

Structure. Male tarsal claws (Fig. 10) long, straight, with equidistant setulae on the ventral margin, evenly and thickly pilose except for the down-curved apical section and widest near base; female claws short, curved, sparsely pilose. Male frons typically narrower at vertex than female frons, but at this point is well over half as wide as the first antennal segment, frons never contracted into a line. Antennae inserted on a level with mid-eye height. Parafacials about one half as wide as eye, narrower in male than female; diagonal furrow indistinct, not forming a margin between one colour area and another. Facial ridge bent, ventral section nearly half the length of dorsal section. Antennae with the third segment 1.7 to 1.8 times the length of the second; apex of the third antennal segment slightly expanded dorsally, but not pointed. Arista inserted on the basal quarter of the third segment. Sensory pits on the third antennal segment small, distinct, over 12 in number. Head narrower than thorax.

Body (Fig. 12) slender, wings narrow, as long as the thorax and abdomen; the basicosta (Fig. 11, *bc*) enlarged, covering the swollen costa base; no thorn at the apex of the subcosta; first posterior cell narrowly open, ending a little way before wing apex; outer cross vein ending on vein 4 near to bend of 4 than to inner cross vein. All tarsi with the two basal segments laterally flattened, the third more or less cylindrical, the fourth and fifth dorsoventrally flattened.

Male genitalia (Figs. 2–4): Valvulae mediales (inner forceps) with (morphologically) anterior as well as the usual posterior lobes; posterior lobes fused forming a "beak", apex slightly depressed, setose ventrally to

apex, setose dorsally to apical quarter; anterior lobes slender, divergent, decurved, almost as long as the posterior "beak", setose, with apical setae not longer than the anterior lobe. Valvulae laterales (outer forceps) slender, almost as long as the "beak", bent about half way, with short setae on outer face and with longer setae on the inner face. Dorsum of the epandrium (tergite 9) with scattered sparse setae. Lobes of sternite V triangular, with long setae on distal margin and towards apex, other setae short. Fused A7 + 8 tergite weakly convex, uniformly setulose; paired sclerites on A6 large, fused medianly.

The virgin female reproductive system (Fig. 13) consists of paired ovaries with 12-14 ovarioles. The length of each oviduct is about equal to that of the common oviduct. The uterus, which is twisted and bent, is about three times the length of the common oviduct. The three black spherical spermathecae appear sessile. Between the thick spermathecal ducts lie the (dorsal) accessory glands which are sessile and faintly yellow. There were 18 well formed eggs in each ovary at six days after emergence. (Based on one specimen.)

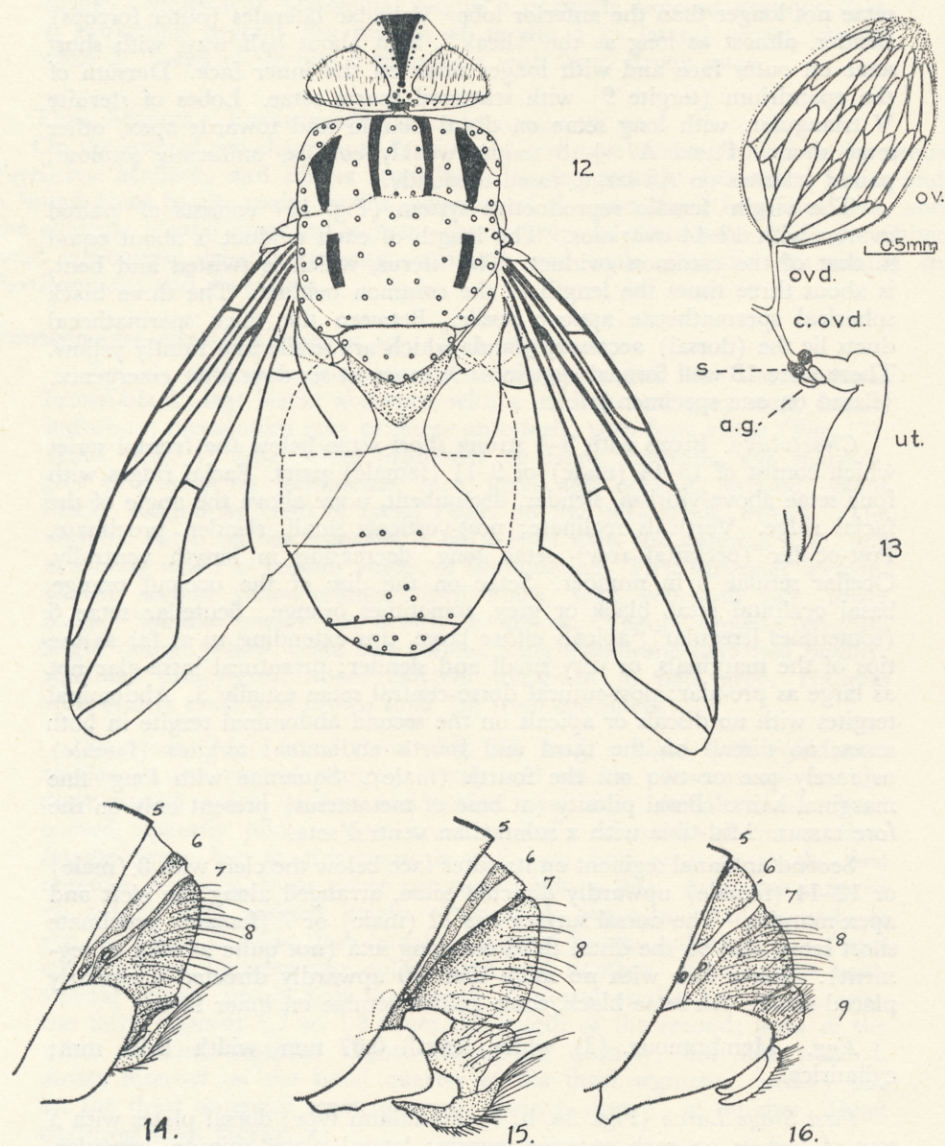
Chaetotaxy. Frons with 3-4 strong short setae below the frontal series which consist of 13-14 (male) or 9-11 (female) pairs. Facial ridges with four setae above vibrissa, slender, decumbent, none above the angle of the facial ridge. Verticals reclinate; post-verticals small, slender, proclinate. Post-ocular (occipital row) setae long, decreasing in length ventrally. Ocellar setulae 5 in number. Setae on the disc of the occiput orange, basal occipital setae black or grey, sometimes orange. Scutellar setae 6 (sometimes irregular), apicals either large, tips extending to as far as the tips of the marginals, or very small and slender; presutural intra-alar not as large as pre-alar; post-sutural dorso-central setae usually 3. Abdominal tergites with no discals or apicals on the second abdominal tergite in both sexes; no discals on the third and fourth abdominal tergites (female) or rarely one or two on the fourth (male). Squamae with long fine marginal hairs. Basal pilosity (at base of metatarsus) present only on the fore tarsus. Mid-tibia with a submedian ventral seta.

Second antennal segment on its outer face below the cleft with 8 (male) or 12-14 (female) upwardly directed setae, arranged along the cleft and apex margins. The dorsal surface has 12 (male) or 7 (female) proclinate short setae, and on the distal third one long seta (not quite as long as segment). Inner face with no more than 10 upwardly directed irregularly placed setae. All setae black, some golden setulae on inner face.

Egg. Membranous, (?) white, length 0.67 mm, width 0.16 mm; cylindrical.

First Stage Larva (Figs. 5a, b; 7) Planidium type; dorsal plates with a row of sockets on each anterior margin; lateral plates minute, irregular, interlocking. Venter of each segment with a sub-spinose band which is smooth on the disc. Thoracic segments heavily sclerotised. Posterior spiracles borne on an oval plate which has a posterior V-shaped indentation; spiracles double, close together, dorsal. Last segment bulbous, evenly spinulose. Length of body, 0.71 mm; width (greatest), 0.18 mm. Pharyngeal skeleton slender; in lateral aspect the apex is securiform. Respiratory horn: little developed, unsclerotised. Larva attached under cuticle of host.

Second Stage Larva (Figs. 6, 8): Each segment with a narrow, complete median transverse band of sparse spinules; larvae attached inside host body wall, free part in haemocoel; respiratory horn projecting from



TEXT-FIG. 2.—(Figs. 12–16). Fig. 12—*P. cerambycivora* male, dorsal aspect showing chaetotaxy (open circles) basal emargination (stippled), vittae and venation. Fig. 13—*P. cerambycivora* female reproductive system (6 day old virgin) left ovary omitted. (a.g., accessory gland; c. ovd., common oviduct; ov., ovarioles; ovd., right oviduct; S., spermathecae; ut., uterus). Fig. 14—*P. cerambycivora*, male, abd. segs. 6–8 in lateral aspect. Fig. 15—*Perrissina albifrons* Malloch, male, ditto. Fig. 16—*Calcager apertum* Hutton, ditto.

the host, dark chestnut. Pharyngeal skeleton with mandibular hooks very much smaller than the posterior sclerite bearing the dorsal and ventral "wings". Body length: 2.5 mm.

Third stage larval pharyngeal skeleton (Fig. 9) with the mandibular hook sclerite wedge shaped with a short chisel-like cutting edge, and larger than the posterior sclerite.

Puparium. Elongate oval, slightly curved longitudinally. Posterior spiracle borne on stigmatal plates which are separated from each other by a distance equal to more than the plate diameter; the plates borne in a well defined crater just dorsad of the longitudinal axis. The stigmatal plates have three slits radiating from a common point. Length of puparium: 6–8.5 mm.

HOSTS. *Didymocantha sublineata* White; *D. quadriguttata* Sharp; *Gastrosarus ? nigricollis* Bates (Coleoptera: Cerambycidae).

MATERIAL EXAMINED. Holotype male, allotype female and 8 female, 3 male paratypes ex *D. sublineata* in *Nothofagus menziesii* (Hook. f.) Oerst.: State forest 90, extreme northern part of Kaimanawa Range (in coll. F.R.I.); 2 males ex *D. quadriguttata* in *N. solandri* (Hook. f.). Oerst.: Tui, Tadmore Valley, Nelson (in coll. F. R. I.); 1 female ex *D. quadriguttata* in *N. solandri* var. *cliffortioides* (Hook. f.) Poole comb: Hanmer State Forest (in coll. F. R. I.) and first stage larva, 2nd stage larva, female reproductive system (virgin), in spirit coll. F.R.I.; two males ex *Gastrosarus ? nigricollis* in *Pomaderris phylicaeifolia* Lodd., Wairapukao, Kaingaroa State Forest (in coll. F. R. I.). Holotype, allotype, and one male, one female paratype deposited in the type collection at Entomology Division, D.S.I.R., Nelson.

REMARKS

Larvae of *P. cerambycivora* have been found in the subdorsal area of the metathorax, or near the first abdominal spiracle, and probably coincidentally, on the right hand side of the host. The first stage larva is a typical planidium as described in Clausen (1940), and lies between the cuticle and the body muscles. The anal region, bearing the posterior spiracles lies just inside a hole in the cuticle. This stage was killed on 24.4.59; two other host larvae from the same material were laboratory-reared, until 28/8/59. An adult parasite had emerged from one larva, leaving the skin of the host with the respiratory horn, and the puparium. The other host contained a second stage larva which was attached at the posterior end to the horn and with the posterior third of its body partly covered by the first stage larval skin (see Fig. 6). The host larva had large amounts of fat-body, and was in its pupal chamber.

The puparium is usually found in the pupation chamber of the host, along with the remains of the host. The adult parasite is not capable of cutting through anything, but it can exert pressure with its ptilinum. The adult emerges through a weakened zone in the bark overlying the chamber. Whether the host or the parasite larva weakens this area is not known, but both have the equipment to do so. The powerful forepart of the pharyngeal skeleton in *P. cerambycivora* suggests that if the host has not made a weakened zone then the parasite larva can; it probably pares the area regardless. The pharyngeal skeleton resembles that of the larval *Phorocera hamata* A & W; this latter species cuts a weakened zone in the very tough cocoons of its tenthredinid host (Baldwin and Coppel, 1947). The pharyngeal skeleton of *Perrissina albiceps*, which pupates in the soil is quite different; the fore part is slender and much smaller than the posterior sclerite. Actual emergence of *P. cerambycivora* has not been observed.

The host larva spends much of its life tunnelling between the bark and the outer sapwood, and ejects frass through small holes cut to the exterior. Deposition of eggs or larvae by the parasite has not been observed, but there is a possibility that either the eggs are laid in the hole, or the larvae gain entry to the host gallery through it. Clausen (1940) considers that tachinids which have a planidium larva either lay eggs from which larvae emerge almost immediately, or are larviviparous.

Thirteen laboratory reared specimens emerged sporadically in the months October to March. From the same branches, forty-eight adults of *D. sublineata* emerged in the months from December to April.

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