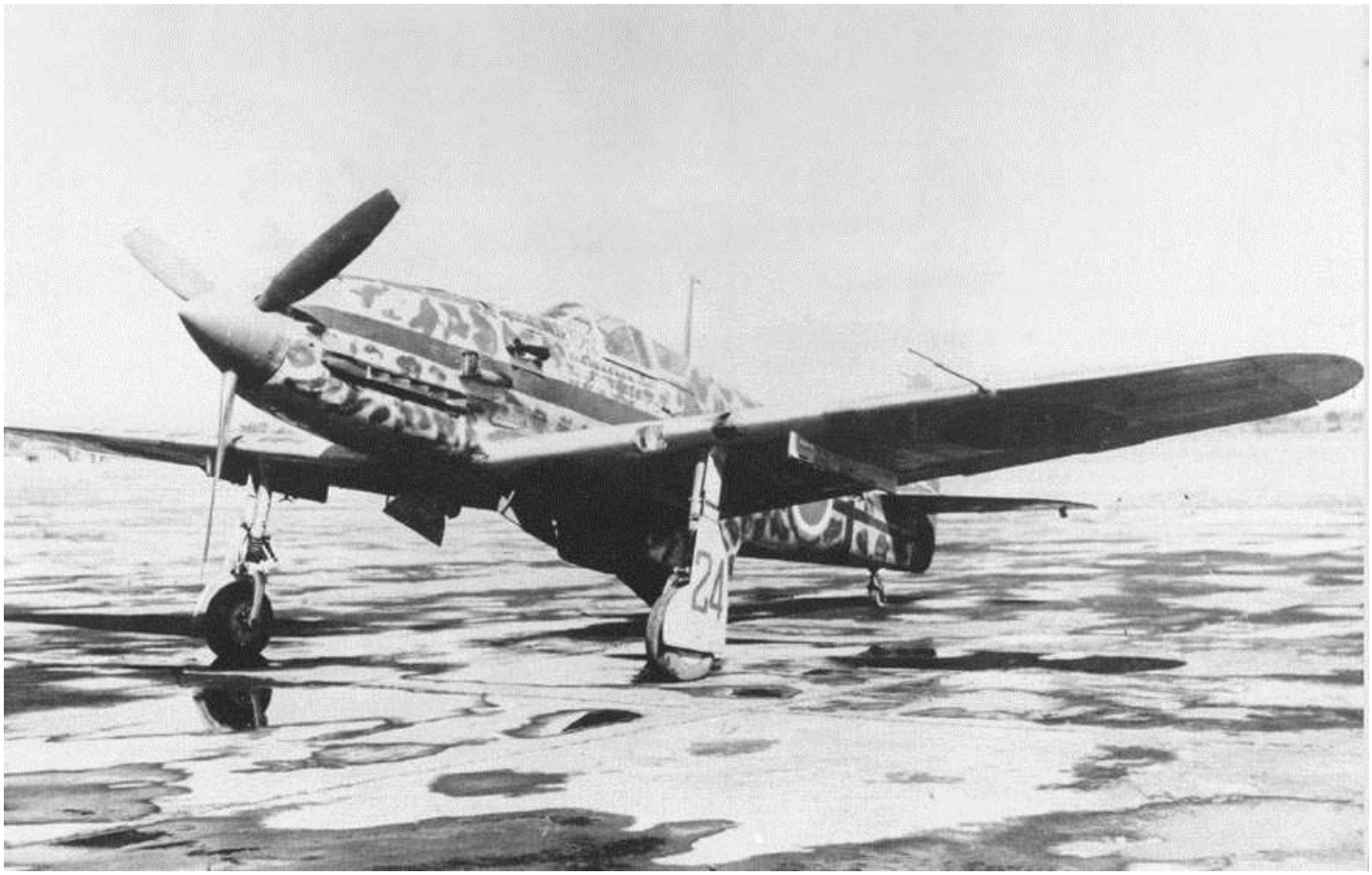
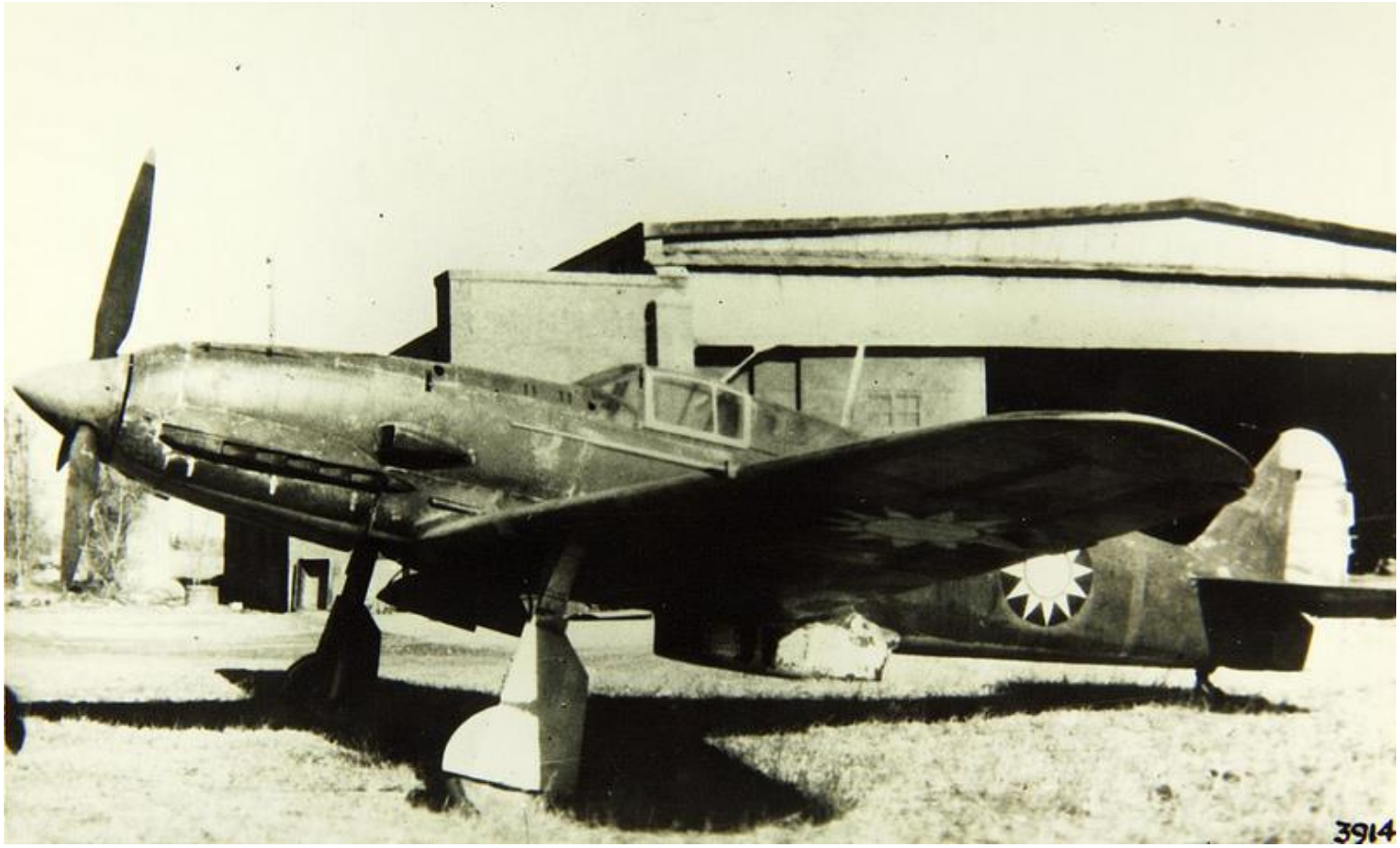
Kawasaki Ki-61 Tony



L'histoire aéronautique japonaise d'avant 1945 est marquée par le quasi-monopole des moteurs en étoile, que ce soit dans les rangs des unités de bombardement ou de chasse. Mais il fut certaines exceptions marquantes et à l'histoire parfois originale. C'est le cas du Ki-61. A la fin des années 1930, le Japon se tournait de plus en plus vers l'idée d'un conflit majeur, en plus de celui qu'il avait déclenché en Chine. Dans cette optique, le renforcement de ses forces armées et de son aviation prenait une importance considérable. Les grands constructeurs japonais étaient régulièrement sollicités pour développer de nouveaux appareils et le renouvellement des flottes aériennes de l'armée et de la marine impériale était rapide. Parmi ces entreprises, la *Kawasaki Kôkûki Kogyô K.K* (officiellement séparée de son conglomérat d'origine en novembre 1937) se distinguait par son dynamisme et son ouverture aux influences étrangères. Sous la houlette de Richard Vogt (qui demeura au Japon de 1923 à 1933 avant de regagner l'Allemagne et d'être embauché par Blohm und Voss), Kawasaki avait acquis une solide expérience dans le secteur des moteurs en ligne et à refroidissement liquide. Bien que plus fragiles et plus difficiles à entretenir que les traditionnels moteurs à refroidissement par air (ce dont eurent à pâtir les appareils déployés en Chine), ils étaient de plus en plus répandus en Europe et représentaient l'une des pistes pour l'avenir de l'aviation militaire. Les autres constructeurs nippons préféraient de loin les techniques plus traditionnelles, au contraire de leurs homologues allemands. L'entrée en service du Daimler-Benz DB-601A à la fin 1937 marqua les esprits au Japon. Ce remarquable moteur équipait les nouveaux et non moins remarquables Messerschmitt Bf 109 de la *Luftwaffe*. L'idée d'en acquérir plusieurs exemplaires fit rapidement son chemin parmi les responsables de l'aviation de l'Armée impériale d'autant plus que les Allemands se montrèrent ouverts à cette idée, grâce notamment à l'appui de Vogt. Le retour d'expérience des combats menés contre les Soviétiques au-dessus du plateau du Nomonhan (11 mai au 16 septembre 1939) convainquit le *Kôkû-Honbu* de l'urgente nécessité de compléter ses moyens aériens avec des chasseurs plus robustes et mieux armés, moins manœuvrables mais capables de monter et de piquer plus vite. Dans ces conditions, le recours au DB-601A apparut comme une excellente base pour mettre au point l'avion dont l'Armée avait besoin.

Kawasaki Ki-61 Tony vu de côté

Kawasaki négociait dès 1938 avec Daimler-Benz. La firme fut chargée au début de l'année 1940 (certaines sources parlent du mois de février, d'autres du mois d'avril) de concevoir deux nouveaux chasseurs, les futurs Ki-60 et Ki-61. Dans le même temps, les discussions menées à Stuttgart aboutirent à un accord majeur : en revenant au Japon à l'été 1940, l'équipe d'ingénieurs et de négociateurs rapportait dans ses bagages l'accord allemand pour la production sous licence du DB-601A, l'ensemble de la documentation technique requise mais aussi trois moteurs complets et deux Bf 109E-4 opérationnels. Tous ces apports devaient faciliter le travail de l'industriel tandis que l'Europe sombrait dans le second conflit mondial. Kawasaki mit à la tête du projet Takeö Doi et Shi Owada, deux ingénieurs déjà renommés. Mais il fallut plus d'un an pour qu'un premier prototype fut prêt : les premiers DB-601A produits au Japon sous la désignation Ha-40 ne sortirent des chaînes de fabrication qu'en juillet 1941, le premier prototype du Ki-61 en décembre de la même année. La priorité un temps accordée à l'intercepteur Ki-60 (sorti en mars mais qui se révéla décevant et qui fut finalement abandonné au profit du Nakajima Ki-44) explique en partie ce délai. A sa sortie de l'usine de Gifu, le premier Ki-61 marqua les esprits. Extérieurement beaucoup plus proche des productions européennes que japonaises, il fut suivi par onze autres avions de présérie (tous produits en 1942). Les essais furent longs et particulièrement difficiles. Plusieurs prototypes furent perdus. En plus de soucis hydrauliques, il fallut consacrer énormément de temps aux moteurs. Les premiers Ha-40 suscitaient autant de critiques que de remarques positives : équipés d'un compresseur leur permettant de bonnes performances en altitude, ils étaient cependant peu fiables et sujets à des pannes récurrentes et parfois catastrophiques. Seuls dix moteurs furent assemblés en 1941, soixante-cinq autres en 1942, ralentissant d'autant l'entrée en service du Ki-61. Mais le programme fut maintenu. Les militaires japonais furent définitivement convaincus après une série d'évaluations en vol opposant un Ki-61 avec un Nakajima Ki-43, un Ki-44, un Bf 109E, un Curtiss P-40E (capturé dans les combats dans le Pacifique) et un LaGG-3 (capturé en Mandchourie ou livré par une défection d'un pilote soviétique). Ces évaluations démontrèrent la supériorité du Ki-61 sur tous ces concurrents, sauf dans le domaine de la maniabilité dans lequel le Ki-43 demeurait imbattable.



Kawasaki Ki-61 Tony taïwanais

En janvier 1943, l'Armée impériale accepta le Ki-61 sous la désignation de *Rikugun San-Shiki Sentô-ki* (chasseur de l'Armée type 3) tandis qu'il reçut l'appellation populaire *Hien* (hirondelle). La première version fut officiellement baptisée Ki-61-I *Kô* (modèle Ia). Trente-quatre exemplaires furent fabriqués en 1942 avant que la production ne monte progressivement en puissance (vingt-deux exemplaires en janvier 1943, soixante en août). L'école de chasse d'Akeno et une unité de conversion opérationnelle (23e *Dokuritsu Dai Shijugo Chutai*) reçurent les tout premiers dès janvier. Les 68è et 78è *Hikô-Sentaï* suivirent ensuite et furent déclarées opérationnelles en mars 1943. Le nouveau chasseur se présentait sous la forme d'un monoplan à ailes basses en trois parties et voilure à profil laminaire. Entièrement métallique (les ailerons et les gouvernes étant couverts de tissu), avec un fuselage semi-monocoque et de forme grossièrement ovale, disposant d'un train escamotable à large voie, il ressemblait énormément à un chasseur allemand ou italien de la même époque. Il en reprenait aussi certaines caractéristiques qui le distinguaient dans les rangs de l'aviation japonaise. Le pilote prenait place dans un cockpit protégé par une verrière blindée et une plaque épaisse de treize millimètres dans son dos, là où se trouvait également un réservoir auto-obturant de cent soixante-cinq litres de carburant. Un gros radiateur rectangulaire était placé sous le cockpit, un second beaucoup plus petit et de forme circulaire alimentant la pompe à injection. Un mât d'antenne se situait en haut du fuselage, derrière le pilote. Le moteur Ha-40 était identique au DB-601A dont il était la copie. Entraînant une hélice métallique tripale à vitesse constante et ne nécessitant pas l'aide d'un camion starter pour le démarrer (il était équipé d'un démarreur à inertie, déclenché par manivelle), il assurait d'excellentes performances. Le Ki-61 frôlait les 600 kilomètres/heure à 6 000 mètres d'altitude. Bien que la voilure fut trop fragile pour pouvoir supporter des bombes, deux emplacements pouvaient porter deux réservoirs largables de deux cents litres chacun portant l'autonomie de l'appareil de six cents à mille cents kilomètres. Deux autres réservoirs de cent quatre-vingt dix litres chacun (également auto-obturants) étaient implantés dans les ailes.

Kawasaki Ki-61 "Tony" capturé en vol

L'armement de bord était conséquent pour un chasseur japonais. Deux mitrailleuses Ho-103 calibre 12,7 mm furent montées dans le capot moteur, deux autres mitrailleuses plus légères calibre 7,7 mm étaient implantées dans les ailes. Mais ce n'était cependant pas suffisant pour faire face aux appareils alliés. Dès le mois de septembre 1942, les Type 89 en voilure furent remplacées par deux Ho-103 supplémentaires. Suffisamment légères et peu encombrantes pour ne pas nécessiter de modifications structurelles trop contraignantes, elles permirent à la production de se maintenir et aux usines de ne pas perdre trop de temps en passant du Ki-61-I *Kô* au Ki-61-I *Otsu* (modèle Ib). Le renforcement de la puissance de feu était la seule vraie différence entre les deux modèles. La production du modèle Ia cessa en septembre 1942 après trois cents cinquante quatre exemplaires. Trois cents onze Ki-61-I *Otsu* suivirent de septembre à décembre, plus deux cents quatre-vingts un de janvier à avril 1943. Les Ki-61 entrèrent dans la Seconde Guerre Mondiale en avril 1943 quand les deux premiers régiments aériens de l'Armée impériale équipés de ce modèle parvinrent à Rabaul puis en Nouvelle-Guinée. Leur arrivée surprit les pilotes américains de la *5th Air Force* qui les prirent d'abord pour des avions de conception italienne (d'où le nom de code *Tony* attribué aux *Hien*). Alors que les tactiques habituelles prescrivaient de fuir les combats tournoyants en piqué pour mieux remonter ensuite à des altitudes plus clémentes (et retomber ensuite sur les appareils ennemis), l'arrivée des *Hien* changea les choses. Plus lourds que les Ki-43 et Ki-44, les Ki-61 étaient suffisamment rapides en piqué pour rattraper et abattre leurs adversaires. Supérieurs aux P-39 et P-40, les Ki-61 étaient davantage en difficulté face aux P-38 nettement mieux armés. Mais la plupart des Ki-61 détruits le furent au sol ou sur des pannes. Déjà peu fiables, leurs Ha-40 souffraient de la chaleur et de l'humidité de la jungle. La dégradation de la logistique japonaise, le manque de pièces détachées et de mécaniciens expérimentés, l'absence de protections sur les terrains d'aviation et les raids aériens alliés entraînèrent la destruction de centaines d'appareils, destructions imparfaitement compensées par des livraisons de plus en plus erratiques. La série d'attaques menées contre les bases de Wewak (du 17 au 21 août 1943) entraînèrent à elles seules la perte de cent chasseurs, dont de nombreux *Hien*. A l'été 1943, les militaires japonais se rendirent à l'évidence. Il fallait améliorer le Ki-61.

Source : https://aviationsmilitaires.net/v3/kb/aircraft/show/1610/kawasaki-ki-61-tony

Version anglaise wikipédia

The **Kawasaki Ki-61 *Hien*** (飛燕, "flying swallow") is a Japanese World War II fighter aircraft. Used by the Imperial Japanese Army Air Service, it was designated the "Army Type 3 Fighter" (三式戦闘機).[2] Allied intelligence initially believed Ki-61s were Messerschmitt Bf 109s and later an Italian Macchi C.202, which led to the Allied reporting name of "**Tony**", assigned by the United States War Department.[3] The design originated as a variant of the Kawasaki Ki-60, which never entered production. The Ki-61 became the only mass-produced Japanese fighter of the war to use a liquid-cooled inline V engine. Over 3,000 Ki-61s were produced. Initial prototypes saw action over Yokohama during the Doolittle Raid on 18 April 1942, and continued to fly combat missions throughout the war.[4][5]

Design and development

The Ki-61 was designed by Takeo Doi and his deputy Shin Owada in response to a late 1939 tender by the *Koku Hombu*[N 1] for two fighters, each to be built around the Daimler-Benz DB 601Aa. Production aircraft would use a Kawasaki licensed DB 601, known as the *Ha-40*, which was to be manufactured at its Akashi plant. The Ki-60 was to be a heavily armed specialised interceptor, with a high wing loading; [N 2] the Ki-61 was to be a more lightly loaded and armed general-purpose fighter, intended to be used mainly in an offensive, air superiority role at low to medium altitudes.[N 3] Both single-seat, single-engine fighters used the same basic construction: all-metal alloys with semi-monocoque fuselages and three-spar wings, with alloy-framed, fabric-covered ailerons, elevators and rudders. Priority was given to the Ki-60, which first flew in April 1941, while design work on the Ki-61 did not begin until December 1940. Although the Ki-61 was broadly similar to the Ki-60, it featured several refinements exploiting lessons learned from the disappointing flight characteristics of the earlier design.[6] The all-metal, semi-monocoque fuselage was basically oval in cross-section, changing to a tapered, semi-triangular oval behind the cockpit canopy, with a maximum depth of 1.35 m (4 ft 5 in). An unusual feature of the Ki-61 was that the engine bearers were constructed as an integral part of the forward fuselage, with the cowling side panels being fixed. For servicing or replacement, only the top and bottom cowling panels could be removed. A tapered, rectangular supercharger air intake was located on the port-side cowling. Behind the engine bulkhead were the ammunition boxes feeding a pair of synchronized 12.7 mm (.50 in) Ho-103 machine guns which were set in a "staggered" configuration (the port weapon slightly further forward than that to starboard) in a bay just above and behind the engine. The breeches partly projected into the cockpit, above the instrument panel. The Ho-103 was a light weapon for its caliber (around 23 kg/51 lb) and fired a light shell, but this was compensated for by its rapid rate of fire. The ammunition capacity was limited, having only around 250 rounds for each weapon. A self-sealing fuel tank with a capacity of 165 L (44 US gal) was located behind the pilot's seat. The windshield was armored and there was a 13 mm (.51 in) armor plate behind the pilot. The radiator and oil cooler for the liquid-cooled engine were in a ventral location below the fuselage and wing trailing edge, covered by a rectangular section fairing with a large, adjustable exit flap.[6]

The evenly-tapered wings had an aspect ratio of 7.2 with a gross area of 20 m^2 (215.28 ft^2) and featured three spars; a Warren truss main spar and two auxiliary spars. The rear spar carried the split flaps and long, narrow-chord ailerons, while the front spar incorporated the undercarriage pivot points. The undercarriage track was relatively wide at 4 m (13 ft 1.5 in). Each wing had a partially self-sealing 190 L (50 US gal) fuel tank behind the main spar, just outboard of the fuselage. A single weapon (initially a 7.7 mm/0.303 in Type 89 machine gun) was able to be carried in a weapons bay located behind the main spar.[6] The first prototype of the *San-shiki-Sentohki ichi gata* ("Type 3 Fighter, Model 1", the official IJAAF designation) first flew in December 1941 at Kagamigahara Airfield.[7] Although test pilots were enthusiastic about its self-sealing fuel tanks, upgraded armament, and good dive performance, the wing loading of 146.3 kg/m^2 (30 lb/ft^2) at an all-up weight of 2,950 kg (6,500 lb) was viewed with scepticism by many of the senior officers of the *Koku Hombu*, who still believed in the light, highly manoeuvrable, lightly armed fighter epitomised by the then new Nakajima Ki-43-I-*Hei* which had a wing loading of 92.6 kg/m^2 (19 lb/ft^2) (and even that was considered borderline compared to the earlier Ki-27).[8] To address these concerns, Kawasaki staged a fly-off between two Ki-61 prototypes and the Nakajima Ki-43-I, a pre-production Nakajima Ki-44-I, a defector-flown Lavochkin-Gorbunov-Goudkov LaGG-3, a Messerschmitt Bf 109E-7, and a captured Curtiss P-40E Warhawk. The Ki-61 proved the fastest of all the aircraft and was inferior only to the Ki-43 in manoeuvrability.[8][9][10][11]

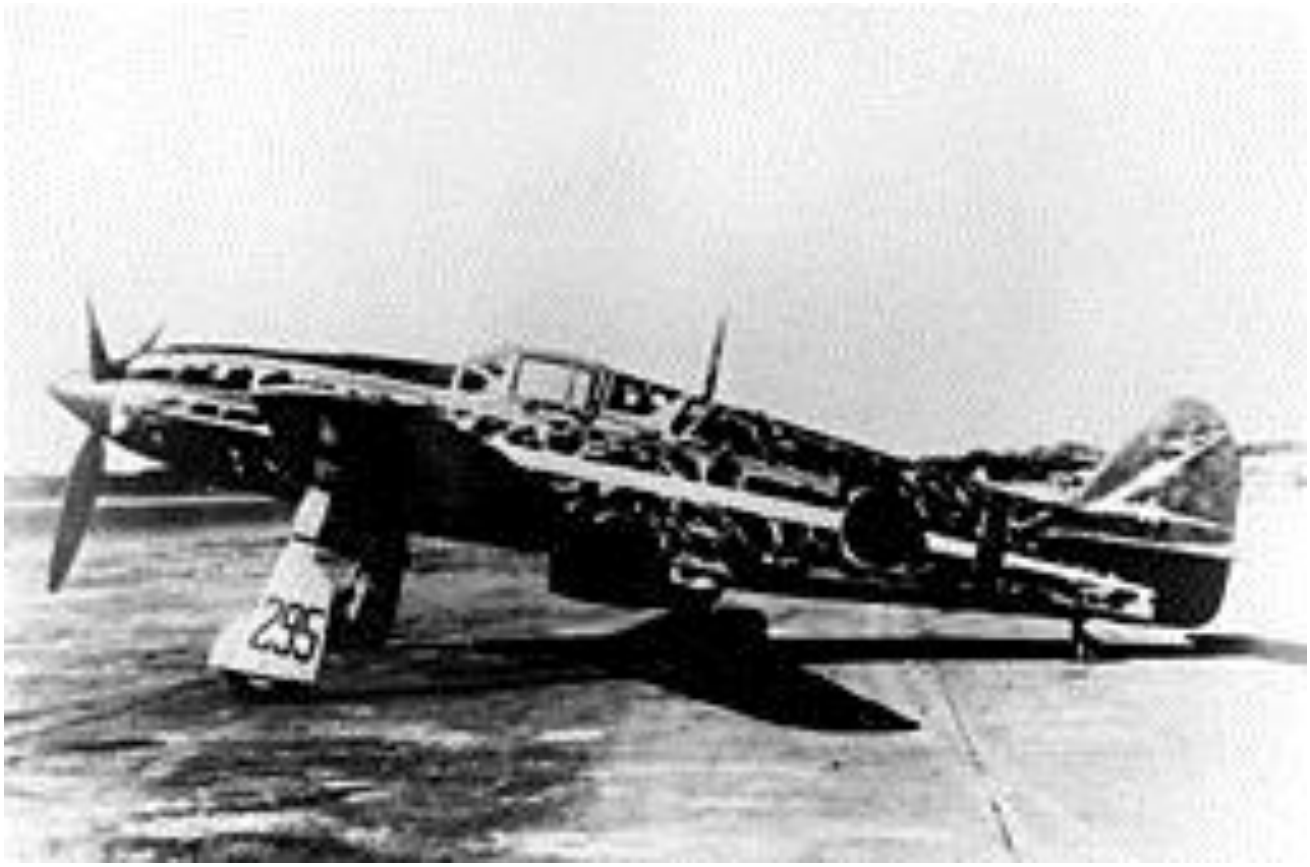
The Ki-61 was the last of the fighters powered by the DB-601 or its foreign derivatives, and it was soon overshadowed by fighters with more powerful engines. By the time it first flew in December 1941, one year after the Macchi C.202's first flight and three years after the first Bf 109E, the engine was already underpowered compared to the new 1,120 kW (1,500 hp) inline or 1,491 kW (2,000 hp) radial engines being developed (and already nearing the mass-production stage) to power the next generation of combat aircraft such as the Republic P-47 Thunderbolt. Moreover, the inline Ha-40 engine proved to be an unreliable powerplant.[12][13] The DB-601 engine required precise and sophisticated manufacturing; the Ha-40 was lighter by roughly 30 kg (70 lb) and required even higher manufacturing standards. Reaching these standards proved difficult for Japanese manufacturers, an issue further complicated by the variable quality of materials, fuel, and the lubricants needed to run a sensitive, high-performance engine. The Japanese equivalent of the more powerful DB-605 engine was the Kawasaki Ha-140, which was fitted onto the Type 3 to produce the Ki-61-II high-altitude interceptor.[12][14] Compared to the Ki-61-I, the Ki-61-II had 10% greater wing area, used more armour and was powered by the Kawasaki Ha-140 engine generating 1,120 kW (1,500 hp). After overcoming initial fuselage and wing stability problems, the new interceptor reverted to the original wing and was put into service as the Ki-61-II-KAI. However, the Ha-140 engine had severe reliability problems that were never fully resolved, and around half of the first batch of engines delivered were returned to the factory to be re-built. A US bombing raid on 19 January 1945 destroyed the engine factory in Akashi, Hyōgo, and 275 Ki-61-II-KAI airframes without engines were converted to use the Mitsubishi Ha-112-II radial engine, resulting in the Ki-100. While the Ha-112 solved the problems encountered with the Ha-140, the new engine still had a major weakness: a lack of power at altitude, which diminished its ability to intercept high-flying B-29 Superfortresses relative to the Ki-61-II.[12][15] During testing, the *Hien* proved capable,[16] but several shortcomings were subsequently revealed in operational service,[*citation needed*] namely the armor protection that was insufficient against larger guns and a sub-standard engine that eventually led to a new engine being considered.[*citation needed*]

Operational history

Unusual wartime photo of a captured Ki-61 being tested by the USAAF

The Ki-61 looked so different from the usual radial-engined Japanese fighters that the Allies at first believed it to be of German or Italian origin, possibly a license-built Messerschmitt Bf 109. The first Ki-61 seen by Allied aircrew had been misidentified as a Bf 109 by USAAF Capt. C. Ross Greening during the Doolittle Raid. In early reports, when it was thought to have been a German fighter, the Ki-61 had been code-named "Mike".[4][5] The final, and better known code name adopted was "Tony", because the Ki-61 looked like an Italian aircraft.[17][18] The new Ki-61 *Hien* fighters entered service with a special training unit, the 23rd *Chutai*, and entered combat for the first time in early 1943, during the New Guinea campaign.[19] The first *Sentai* (Air Group/Wing) fully equipped with the *Hien* was the 68th in Wewak, New Guinea,[19] followed by the 78th *Sentai* stationed at Rabaul. Both units were sent into a difficult theatre where jungles and adverse weather conditions, coupled with a lack of spares, quickly undermined the efficiency of both men and machines. Because the Ki-61 was so new, and had been rushed into service, it inevitably suffered from teething problems. Almost all of the modern Japanese aircraft engines, especially the Ki-61's liquid-cooled engines, suffered a disastrous series of failures and ongoing problems,[13] which resulted in the obsolescent Ki-43 still forming the bulk of the JAAF's fighter capability. Initially, this campaign went successfully for the Japanese Army Air Force (JAAF), but when the Allies re-organized and enhanced the combat capabilities of their air forces, they gained the upper hand against the JAAF.[13] High non-combat losses were also experienced by the Japanese during this campaign. For example, while in transit between Truk and Rabaul, the 78th lost 18 of its 30 Ki-61s.[20][21]

Even with these problems, there was some concern in Allied aviation circles regarding the *Hien.* The new Japanese fighter caused some pain and consternation among Allied pilots, particularly when they found out the hard way that they could no longer go into a dive and escape as they had from lighter Japanese fighters. General George Kenney, the Allied air forces commander in the Southwest Pacific, found his Curtiss P-40s completely outclassed, and begged for more Lockheed P-38 Lightnings to counter the threat of the new enemy fighter.[*citation needed*] However, the increasing numerical strength of Allied bomber units, along with inadequate anti-aircraft systems, imposed crippling losses on Japanese units. Approximately 174 out of 200 Japanese aircraft based in the Wewak area were lost during the attacks of August 17–21 1943.[22] By the end of the campaign, nearly 2,000 Japanese aircraft had been lost in air attacks from up to 200 Allied aircraft at a time, around half of which were Consolidated B-24 Liberators and North American B-25 Mitchells armed with fragmentation bombs.[13] After the Japanese retreat, over 340 aircraft wrecks were later found at Hollandia.[13]



Capt. Teruhiko Kobayashi's Ki-61 of the 244th Sentai

The Ki-61 was also utilised in Southeast Asia, Okinawa, China and as an interceptor during US bombing raids over the Japanese home islands, including against Boeing B-29 Superfortresses. The Ki-61 was notable for many reasons: initially identified as of either German or Italian origin, these aircraft were capable of matching Allied aircraft such as the P-40 in speed, and as evaluation had already shown, were superior in almost every respect. However, the armament of the early *Hien* was lighter, but still sufficient for most purposes. Some authors claim that the Lockheed P-38 Lightning was measurably superior.[23] The Ki-61 carried a great deal of fuel, but due to having self-sealing fuel tanks it was not considered readily flammable, as many other Japanese aircraft were.[12] Owing to the additional weight, the Ki-61's performance and agility suffered when its armament was increased, but it still remained capable with a 580 km/h (313 kn) maximum speed. The cannon armament was needed to counter the Allied bombers, which proved to be difficult to shoot down with only 12.7 mm (.50 in) machine guns. The empty and maximum weights for the Ki-61 prototype (2 × 12.7 mm/0.50 in + 2 × 7.7 mm/0.303 in) were 2,238 kg (4,934 lb) and 2,950 kg (6,504 lb), respectively; for the Ki-61-I basic (4 × 12.7 mm/.50 in) 3,130 kg (6,900 lb); and for the Ki-61-KAI (2 × 12.7 mm/0.50 in + 2 × 20 mm), 2,630 kg (5,798 lb) and 3,470 kg (6,750 lb).[12] A number of Ki-61s were also used in *Tokkotai* (*kamikaze*) missions launched toward the end of the war. The Ki-61 was delivered to 15th *Sentai* (group/wing), as well as some individual *Chutaicho* (Squadron Leaders) in other *Sentai*, and even to operational training units in the JAAF. The aircraft was largely trouble-free in service except for the liquid-cooled engine which tended to overheat when idling on the ground and suffered from oil circulation and bearing problems.[24]

Ki-61 Special Attack Unit

An ex-23rd *Sentai*, 2nd *Chutai* Ki-61 found and photographed at Inba airbase by USAAF personnel in 1946.

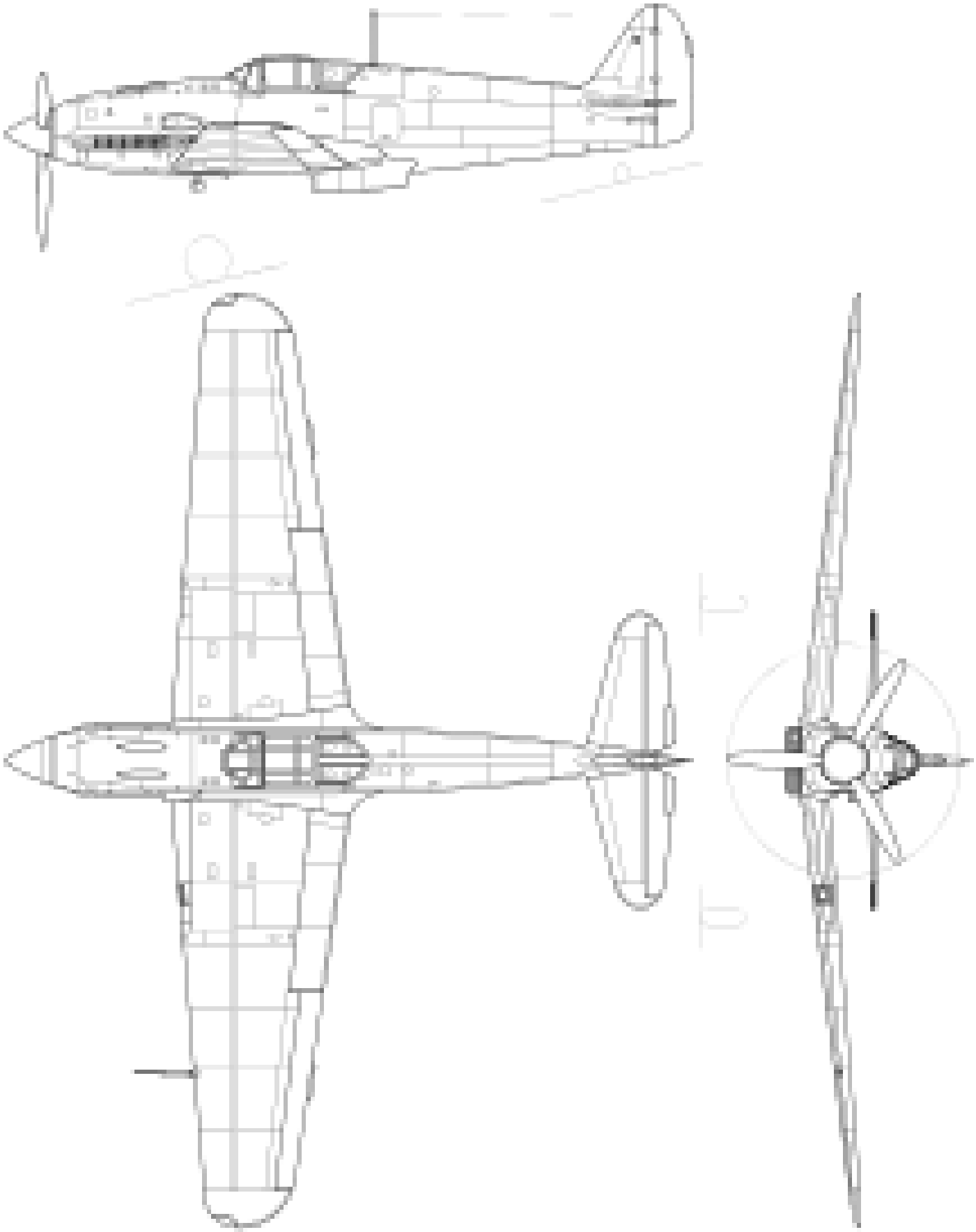
The tactic of using aircraft to ram American Boeing B-29 Superfortresses was first recorded in late August 1944, when B-29s from Chinese airfields attempted to bomb the steel factories at Yawata. Sergeant Shigeo Nobe of the 4th *Sentai* intentionally flew his Kawasaki Ki-45 into a B-29; debris from the explosion severely damaged another B-29, which also went down.[N 4][25] Other attacks of this nature followed, as a result of which individual pilots determined it was a practicable way of destroying B-29s.[26]

On 7 November 1944, the officer commanding the 10th *Hiko Shidan* (Air division) made ramming attacks a matter of policy by forming ramming attack flights specifically to oppose the B-29s at high altitude. The aircraft were stripped of their fuselage armament and protective systems in order to attain the required altitudes. Although the term "*kamikaze*" is often used to refer to the pilots undertaking these attacks, the word was not used by the Japanese military. The units assigned to the 10th *Hiko Shidan* included the 244th *Hiko Sentai* (Fighter group), then commanded by Captain Takashi Fujita, who organised a ramming flight called "*Hagakure-Tai*" ("Special Attack Unit"), which was composed out of volunteers from the three *Chutai* (squadrons) of the 244th: the 1st *Chutai* "*Soyokaze*", 2nd *Chutai* "*Toppu*", and the 3rd *Chutai* known as "*Mikazuki*". First Lieutenant Toru Shinomiya was selected to lead the *Hagakure-Tai*. On 3 December 1944, Shinomiya – along with Sergeant Masao Itagaki and Sergeant Matsumi Nakano – intercepted a B-29 raid; Shinomaya rammed one B-29, but was able to land his damaged Ki-61, which had lost most of the port outer wing, back at base. After attacking another B-29 Itagaki had to parachute from his damaged fighter, while Nakano rammed and damaged *Long Distance* of the 498th BG and crash-landed his stripped-down Ki-61 in a field. Shinomaya's damaged Ki-61 was later displayed inside Tokyo's *Matsuya* department store while Nakano's Ki-61 was displayed outside, alongside of a life-size cut-away drawing of the forward fuselage of a B-29.[27][N 5] These three pilots were the first recipients of the *Bukosho*, Japan's equivalent to the Victoria Cross or Medal of Honor, which had been inaugurated on 7 December 1944 as an Imperial Edict by Emperor Hirohito (there are 89 known recipients, most of whom fought and scored against B-29s).[28][29] The existence of the ramming unit had been kept confidential until then, but it was officially disclosed in the combat results announcement and officially named "*Shinten Seiku Tai*" ("Body Attack Detachment") by the Defense GHQ. On 27 January 1945, Itakagi survived another ramming attack on a B-29, again parachuting to safety, and received a second *Bukosho*; he survived the war as only one of two known double-*Bukosho* recipients.[30] Sergeant Shigeru Kuroishikawa was another distinguished member of the unit.

A Ki-61 of the 149th shumbutai, taken in Ashiya after the war. The tail markings indicate it formerly came from the Akeno Kyodo Hikoshidan and the 59th sentai before being allocated to the 149th.

Despite their successful attacks, these pilots gained no reprieve, and were obliged to continue these deadly and dangerous ramming tactics until they were killed, or else wounded so badly that they could no longer fly. They were regarded as doomed men and were celebrated among the ranks of those who were going to certain death as *Tokkotai* (*kamikaze*) pilots.[31] Some other Ki-61 pilots also achieved renown, among them Major Teruhiko Kobayashi of the 244th Sentai, who was credited by some with a dozen victories mostly due to conventional attacks against B-29s.[32]

Specifications (Ki-61-I-KAIc)



3-view drawing of Kawasaki Ki-61

General characteristics

- **Crew:** 1
- **Length:** 8.94 m (29 ft 4 in)
- **Wingspan:** 12 m (39 ft 4 in)
- **Height:** 3.7 m (12 ft 2 in)
- **Wing area:** 20 m^2 (220 sq ft)
- **Airfoil:** NACA 2R 16 wing root, NACA 24009 tip
- **Empty weight:** 2,630 kg (5,798 lb)
- **Gross weight:** 3,470 kg (7,650 lb)
- **Fuel capacity:**
- **Internal** 550 L (150 US gal; 120 imp gal)
- **External** 2x 200 L (53 US gal; 44 imp gal)
- **Powerplant:** 1 × Kawasaki Ha40 inverted liquid-cooled V-12 piston engine, 864 kW (1,159 hp)
- **Propellers:** 3-bladed variable pitch propeller

Performance

- **Maximum speed:** 580 km/h (360 mph, 310 kn) at 5,000 m (16,000 ft)
- **Range:** 580 km (360 mi, 310 nmi)
- **Service ceiling:** 11,600 m (38,100 ft)
- **Rate of climb:** 15.2 m/s (2,990 ft/min)
- **Time to altitude:** 7.0 min to 5,000 m (16,000 ft)
- **Wing loading:** 173.5 kg/m^2 (35.5 lb/sq ft)
- **Power/mass:** 0.25 kW/kg (0.15 hp/lb)

Armament

- **Guns:**
  - 2× 20 mm (0.79 in) Ho-5 cannon, 120 rpg
  - 2× 12.7 mm (0.50 in) Ho-103 machine guns, 250 rpg
- **Bombs:** 2× 250 kg (550 lb) bombs

Source : https://en.wikipedia.org/wiki/Kawasaki_Ki-61